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TWO CASES OF FAT-NECROSIS.[1]

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E. H., a male Swede, came to America when eight years old. His parents lived beyond seventy. His early life was spent on a farm; his latter life in a large and lucrative business. He was a stout man of the blonde type, nervous and always active. He had suffered from otitis media, the loss of the right ear-drum, and had for two years experienced the sensation of giddiness, but no tinnitus.

He tired easily, was flatulent, and slightly constipated. The pulse was frequent and poorly sustained; the cardiac impulse was obscure and felt to the left of the nipple-line. In twenty-four hours he voided 1428 c.cm. of urine, acid in reaction, containing 15.708 gm. of urea, no albumin, no sugar, and was negative microscopically.

Under the influence of massage, baths, and a regular diet continued one year, his general condition improved, and he was persuaded to take a European trip for rest. The change was enjoyed, and he reported steady improvement, although he apparently displayed as a tourist his characteristic activity. On the eve of his return he visited the canal at Manchester, and reached Liverpool chilled and exhausted. He ate heartily at dinner, but soon after was seized with vomiting, retention of urine, and abdominal tenderness and pain. Dr. W. S. Crawford, of Liverpool, catheterized him, and during the night administered 7/8 grain of morphine hypodermatically. The temperature was 100°, and the circulation feeble. The vomiting continued, with moderate pain and great thirst. The doctor writes me that he believed that the patient suffered from subacute peritonitis. Feeling slightly relieved, the home-voyage was undertaken three days after the onset of the

[1] Read before the Association of American Physicians, May 30, 1895.

attack. The patient grew steadily worse, vomited daily, retained absolutely no nourishment, and required morphine for the relief of pain. The ship's surgeon, Dr. S. R. Radmore, of the "Teutonic," felt himself fortunate in turning over the patient alive to the late Dr. Goldthwaite, of New York. Our late fellow, Dr. Loomis, saw the patient the night of his arrival; I saw him the next morning. The striking features of the case at the time were those of prostration, suggesting shock and toxæmia. A possible appendicitis was considered by Dr. Loomis, but he was not prepared to make a positive diagnosis nor to advise operation. I did not see the patient again for three days, when I returned to escort him to Buffalo. He was then in coma, and died six hours after reaching home.

There were present during the last days general abdominal tenderness, moderate pain and tympany, no induration, the temperature never above 100°, and the pulse frequent and very feeble. Koumys, whiskey, and water were retained in fair quantity. The alvine evacuations appeared natural. Dr. Goldthwaite reported the urine free from albumin and sugar, although Dr. Radmore had found albumin present during the voyage. Catheterization was required before the use of anodyne. The diagnosis was not made. The general expression of the case was not unlike that of uræmia, but there was more abdominal tenderness and pain than seemed consistent with such a condition alone. The morbid anatomy is described further on by Dr. H. U. Williams.

Eleven days later, October 29th, there appeared in my ward at the Buffalo General Hospital, a Swede, E. A., male, aged thirty-nine years, a laborer. For three weeks preceding he had been under the care of Dr. W. H. Slacer, who reported that the man had been taken ill while at work some weeks prior with abdominal pain and nausea. At the time of examination, October 9th, the pulse was weak, counted 90, and the temperature marked 101°. The patient was emaciated, anæmic, slightly icteric, the tongue heavily coated, constipated, the feces light yellow and offensive. The urine was said to be natural in color and quantity, specific gravity 1024, with absence of sugar, albumin, and sediment.

The stomach was distended with gas; there was great tenderness over the stomach and to the right of the umbilicus. There were anorexia, great thirst, and occasional vomiting. Dr. Slacer attended the man for chills and fever one year before, from which he had made a complete recovery.

When received into the hospital the patient was greatly prostrated, and complained of sharp, lancinating abdominal pain, especially in the region of the umbilicus. There was general abdominal tenderness, slight tympany, but no perceptible induration.

As to his general condition, the skin was muddy and slightly icteric, the tongue was heavily coated, the pulse varied from 80 to 90 and was very feeble, the temperature was 99°. Time did not permit of a thorough examination of the urine, but it was found free from albumin and sugar. The man was unable to retain nourishment. He was given nutrient enemata, besides digitalis and strychnine hypodermatically. Morphine was repeatedly required for the relief of pain. This case resembled so closely the one previously described that I was much disappointed to find on the following day that the patient was dead, without a diagnosis having been made. The similarity of the cases will

appear more striking after hearing Dr. Williams's report of the post-mortem examinations.

October 18, 1894, 4 P. M. Mr. E. L. H., Swede, aged fifty-nine years; dead thirteen hours. Rigor mortis firm in legs, not so well marked in arms; body appears well nourished; post-mortem lividity present over the back; subcutaneous fat 18 mm. thick over the thorax, 30 mm. thick over the abdomen; muscles of thoracic and abdominal walls scantily developed; costal cartilages calcified. Left lung free throughout; right lung adherent at apex; both lungs crepitated well and appeared normal; moderate congestion and œdema posteriorly. No unusual amount of pericardial fluid; valves of heart normal; muscles of left ventricle somewhat thinned, soft; cavity of left ventricle slightly dilated; aortic intima fatty. Spleen small, dark, and friable. Liver rather small, slightly fatty. Gall-bladder small, walls thickened, containing numerous dark gall-stones the size of buckshot. Mucous membrane of stomach, small and large intestines appeared normal; that of the large intestine showed white dots the size of a pin's head, scarcely noticeable; appendix 30 mm. in length, size of chicken-quill in diameter; except for its small size, normal. Kidneys imbedded in abundant fat, of each the capsule stripped off easily; parenchyma pale, cortex narrow; two small cysts on the surface of the right kidney. Urinary bladder contained about four ounces of urine; mucous membrane normal.

Most interesting was the condition of the fatty tissues of the abdominal cavity. The subperitoneal fat and that of the mesentery, mesocolon, and omentum was abundant. Imbedded in the fat of the omentum, mesentery, and mesocolon were great numbers of round, hard, white masses of variable size, mostly smaller than buckshot, white and opaque on section. In the mesocolon they were extremely abundant, often soft, and becoming confluent, making a pultaceous mass. The same condition prevailed in an extreme degree in the retroperitoneal fat behind the colon, stomach, and spleen.

Removal of the spleen revealed a large cavity, extending downward between the left kidney, the colon, and the stomach, containing a soft, cheesy substance resembling pus, with masses nearly as large as a pea, of firmer consistence. The fatty tissues bounding this cavity were grayish and necrotic in appearance. In this cavity lay the pancreas, surrounded by the same kind of material, some of which also was adherent to it. The fat about the kidney was sharply separated from the other retroperitoneal fat, and was unaltered, as was the fat of the anterior abdominal and thoracic walls.

The pancreas was eighteen centimetres in length, and to the unaided eye the parenchyma appeared normal; the duct of Wirsung was normally situated and was patulous. Microscopic examination showed its wall to be denuded of epithelium, except in the deeper folds, in which the epithelium refused to stain; the other tissues of the duct also stained badly; no cell-infiltration into it or around it was observed. On microscopic examination of the parenchyma of the pancreas the epithelium was found to take no nuclear stain at all in sections made at a number of points between the head and tail. The epithelium of the ducts behaved in a similar manner. The amount of interstitial connective tissue was not unusual. Over small areas it was moderately infiltrated with fat. A region of this character near the tail showed a small spot of fat-necrosis, having the character to be described later. The capsule

for the most part was not thickened, and exhibited no cell-infiltration; near the tail it was slightly thickened and showed a small hemorrhage; it contained numerous round, oval, and spindle-shaped nuclei. No bacteria could be demonstrated in this pancreas, except in a single section from near the head, in which the duct of Wirsung contained numerous short, plump bacilli with rounded ends.

October 31, 1894, 4 P. M. Mr. E. A., aged thirty-nine years; dead fourteen hours. Rigor mortis firm; well formed, but slim; post-mortem discoloration well marked in buttocks, back, backs of arms, and neck; a number of dark spots in skin of anterior surface of right thigh, right upper arm, and left hip. Subcutaneous fat over thorax 6 mm. thick, over abdomen 18 mm. thick; subperitoneal fat well developed. Both lungs free from adhesions; pleural cavity empty; lungs small, crepitated well, and were normal; right weighed 13 ounces, left 9 ounces.[1] Pericardial cavity free from fluid; heart of normal size, weight 8½ ounces; usual amount of subpericardial fat; right ventricle contained large yellow clot, valves normal, muscle of ventricle of usual thickness and healthy; aorta moderately atheromatous. Spleen weighed 7 ounces, of normal appearance. Liver appeared fatty; centres of lobules congested. Gall-bladder dilated, encroaching on anterior surface of liver, which was notched correspondingly; its shape was unusual, being constricted about the middle, and the cystic duct compressed by a fibrous band; bile passed freely into the duodenum on pressure, however. Mucous membrane of stomach and duodenum normal; that of jejunum congested and œdematous, covered with mucus; ileum less so, except the lower two feet, which were congested. About three feet above the ileo-cæcal valve ileum was bound down by a recent-appearing adhesion, not very firm. Breaking of this adhesion disclosed behind it a cavity as large as a walnut, containing fluid resembling pus and small, harder masses. Appendix vermiformis 8.8 cm. in length, of which 7.5 cm. were free; tissue about the cæcum normal; mucous membrane of the colon near the splenic flexure necrotic and easily torn; colon beyond this point congested; contents yellowish, semifluid. Kidneys weighed 5½ ounces each; capsules stripped off with ease, appeared a little swollen; cortices very pale, medullæ dark; suprarenal bodies normal in size and appearance.

The peritoneum showed no congestion or exudate; beneath it the fatty tissues of the abdominal wall were sparingly dotted with small, hard, white nodules; the same were present in larger numbers in the mesentery; they were seen about the cæcum. Removal of the spleen disclosed a mass of necrotic tissue, soft, grayish, containing fluid resembling pus, small, hard, white masses, and others easily crushed between the fingers. This condition extended through the retroperitoneal fat-tissue to the splenic flexure of the colon. The necrotic portion of the colon already mentioned was in contact with black necrotic tissue behind it.

The fatty tissues about the pancreas were included in the same necrotic area. The outer surface of the pancreas was grayish-black, and dotted with the same white masses. The pancreas was 26 centimetres in length; weight, 2½ ounces. The head was large, quadrilateral, margin angular, sharply separated from the rest of the

[1] The scale employed was a common grocer's scale. It seemed best to give the weights as they were taken

organ, which was united with the head by a constricted portion, about the size of a lead-pencil. (See Fig. 1.) Section of the pancreas showed it to be hard, fibrous tissue present in abnormal amount; parenchyma unusually reddened. The duct of Wirsung was patulous; microscopic examination showed its epithelium attached for the most part and well stained, and its walls appeared otherwise normal. In a section made through the head one of the large ducts was seen to be filled with desquamated epithelium and small round cells; this was not observed in other ducts. The epithelium of the parenchyma took the

FIG. 1.

Pancreas. Case II. (×⅓.)

nuclear stain poorly. Occasionally small areas were observed not having any nuclear stain at all. The amount of interstitial connective tissue was unusual; it contained numerous nuclei and small hemorrhagic spots; number of fat-cells not striking. A section made through the constricted part of the pancreas mentioned showed two spots of fat-necrosis. The capsule was thick, consisting of fibrous tissue, with numerous round, oval, and spindle-shaped nuclei and hemorrhagic areas.

Numerous bacilli, small and large, often forming strings, with square ends, were found in the capsule, extending to a less degree into the interstitial tissue between the acini for a short distance from the capsule.

Microscopic examination of the duodenum showed very large numbers of goblet-cells in the epithelial lining, moderate congestion, no cell-infiltration.

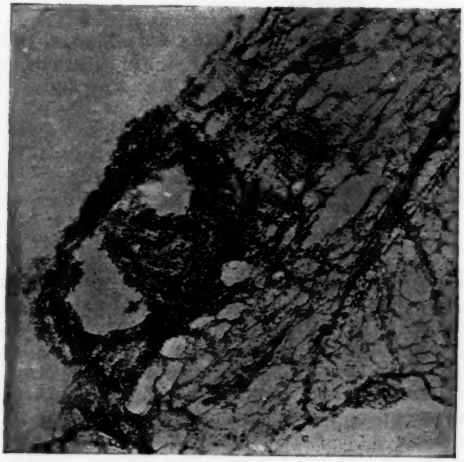
The histological appearances of the necrotic fat-material were identical in the two cases; they will therefore be described together. The pultaceous fluid consisted of opaque masses and granules, highly refracting

FIG. 2.

Frozen section of area of necrotic fat at its margin. Case I.

globules, and needle-shaped crystals. Frozen sections of the white necrotic nodules showed them to be made up of similar coarse granules

FIG. 3.

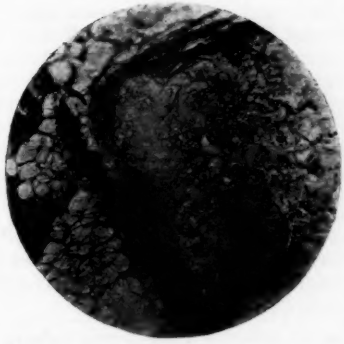


Fatty necrotic area, showing cell-infiltration after removal of fat and calcium-salts by ether and acetic acid, and staining with carmine.

and masses, globules and crystals, and a small amount of masses of brown pigment. Some of them appeared to be enclosed in part by a

definite connective-tissue boundary. The surrounding tissue was moderately congested; a few small extravasations were noted; the fat cells appeared normal. (Fig. 2.) Sections of the same imbedded in celloidin and stained with hæmotoxylin or carmine gave similar results. In them, however, the presence of a connective-tissue boundary to the spots of fat-necrosis was often demonstrated, even to the extent of forming a thick capsule. There was marked infiltration of this capsule and less of the underlying part, with cells having good-sized, round, oval, or spindle-shaped nuclei. The relatively healthy fat-tissue sometimes showed an increased number of nuclei. (Fig. 3.) Furthermore, owing to the partial solution of the opaque material by the ether used in imbedding, the outlines of what appeared to be fat-cells could be plainly seen in parts of these necrotic areas; and strands of connective tissue were visible traversing the areas. (Fig. 4.) Frozen sections of

FIG. 4.



Margin of nodule of fat-necrosis, showing connective-tissue boundary and nuclei in it, and outlines of what appear to be fat-cells within the nodule. (Imbedded in celloidin, stained in carmine. × 130.)

the spots of fat-necrosis were partially cleared up by the use of either ether or acetic acid; when the two reagents were used successively the opacity disappeared entirely. Evidently ether dissolved the fatty material, leaving an opaque substance, soluble in acetic acid; probably some calcium-compound. Analyses made by Dr. Lytle, Instructor in Chemistry, show the necrotic nodules to contain calcium phosphate in abundance, other earthy salts sparingly or in traces. These results are partly in accordance with the observations of Langerhans,[1] who found calcium in combination with fatty acids. Since our analyses were qualitative only, the possibility that enough calcium may have been present to unite with some of the fatty acids as well as the phosphoric acid is not excluded.

The prominence of the nodules of fat-necrosis and the condensation of the connective tissue in front of them point toward an increase in size from a deposit of new material in them. It has already been noted that relatively unaltered fat-cells and strands of connective tissue were

[1] Langerhans: "Uber multiple Fettgewebsnekrose." Virchow's Archiv, 1890, p. 122.

to be seen within them. The congestion, hemorrhages, and cell-infiltration indicate an inflammatory reaction about them.[1] Many sections appear to justify the view of Langerhans that the connective-tissue boundary of the necrotic nodule coincides with the connective tissue originally surrounding a fat-tissue lobule.

Numerous bacilli were found between the fat-cells about the spots of fat-necrosis in Case II.; large rods with square ends were most numerous; some smaller forms with rounded ends were also seen. They were not detected in the spots of fat necrosis themselves, nor were they more noticeable in their immediate vicinity than at some distance removed.

No bacteria could be found with the microscope in the fatty tissues of Case I., and unfortunately the circumstances attending the autopsy prevented the use of culture-methods. In Case II., however, inoculations were made both from the pancreas and the necrotic fat. From each a variety of bacillus was isolated in pure culture.

From the fat a bacillus was obtained, having rounded ends, growing both as short oval forms and as long filaments, actively motile, liquefying gelatine rapidly, and flourishing on the ordinary culture-media. It appears to be a variety of Proteus. Broth cultures injected into the abdominal subcutaneous tissues of rabbits evoked local suppuration; nothing resembling fat-necrosis was produced. From the pancreas a bacillus with rounded ends was isolated, growing both as short, oval, and long filamentary forms, not motile, or but slightly so, not liquefying gelatine, growing on the ordinary culture-media, coagulating milk, producing gas and acid reaction in 2 per cent. glucose-bouillon, giving a faint indol reaction in peptone solution, and in all respects behaving like Bacillus coli communis. Broth-cultures injected into the subcutaneous tissues of the abdominal wall of rabbits evoked local suppuration, but nothing like fat-necrosis could be found. Welch found the colon bacillus in the necrotic fat.

We do not appear, in either of these forms, to have secured the large bacillus with square ends seen in sections of the pancreas and fat-tissues. We are not, however, disposed to lay much stress upon it or upon them. It will be remembered that the pancreas lay, floating almost, in a cavity filled with a kind of pultaceous *débris*, and that this cavity was in part bounded by the splenic flexure of the colon, whose mucous membrane was in a necrotic condition. Under these circumstances the penetration of bacteria into the pancreas and fat to the extent observed is not surprising.

Furthermore, the histological alterations seen in the pancreas in each of the cases are probably accounted for by the condition of the surrounding tissues. Beyond the presence of a limited number of very small areas of fat-necrosis in the interstitial tissues of the gland and the occurrence of small hemorrhages, the organ in neither case showed more change than we have often seen in the perfectly healthy pancreas taken from the cadaver and preserved in the same manner as in those in question.

[1] Chiari: "Ueber die segenannte Fettnekrose." Prager medicinische Wochenschrift, 1883, No. 30.

Perhaps the most striking feature of the cases under discussion is the existence in both of well-marked disseminated fat-necrosis, and in neither of well-marked pancreatic change. Chiari mentions having had a case of the same kind. The experience of most observers has been otherwise.[1]

It is noteworthy that in each of our cases there was abnormality of the gall-bladder; in the first in the shape of gall-stones, in the second in fibrous adhesions, the result of previous inflammation.

We are indebted to Prof. H. M. Hill, of Buffalo, for Figs. 1, 2, and 3, and to Dr. A. G. Hoen, of Baltimore, for Fig. 4.

A CASE OF LARGE, ROUND-CELLED SARCOMA OF THE TONGUE.

By Edward K. Dunham, M.D.

A tumor of the tongue, which upon microscopical examination proved to be a sarcoma, composed chiefly of large, round cells, was removed from a man sixty-one years of age, by Dr. J. D. Bryant, at Bellevue Hospital, New York, on January 27, 1894. Such sarcomata of the tongue are so unusual that this case seems worthy of record:

The clinical history is meagre. The parents of the patient are both dead; the father from some unknown cause, the mother from "old age," at seventy-three years. The patient had one brother and four sisters. The brother and one sister died of tuberculosis, the three other sisters are alive and well.

The patient has had good general health. He can recall having had malaria forty years ago, and has had some rheumatic pains in the right shoulder during the past year. He has been a moderate drinker, and has smoked a good deal, averaging about ten pipes a day.

Eight months before the operation he says that he bit his tongue, causing a blister, which did not disappear, but became irritated by contact with decayed teeth, and after about three months began to grow hard. From that time it grew slowly until a tumor three-quarters of an inch in diameter had been formed. He then applied for treatment.

The tumor was on the right border of the tongue, about an inch from the tip, or opposite the first bicuspid teeth. It was globular in form, smooth except for a few prominent papillæ on the upper surface, and presented no ulcerations. Its attachment to the tongue was broad, and not pedunculated. After its removal incision of the tumor revealed an almost perfectly spherical, light pinkish-gray neoplasm, of apparently uniform structure and moderately firm to the touch. The mucous membrane of the tongue could be traced as a thin covering over the whole surface of the growth, which did not appear to infiltrate the under-

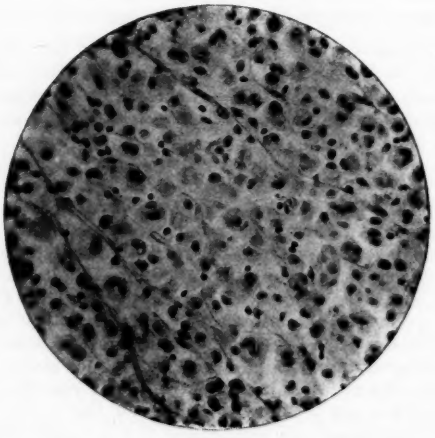
[1] Fitz: Medical News, vol. liv., 1889.

lying muscular tissue. The accompanying illustration gives the appearance of the posterior aspect of the tumor in its bloodless state after hardening. It is a trifle less than natural size.

FIG. 1.

The tumor is chiefly of interest because of its structure. When examined under a low power of the microscope the epithelial covering of the tongue could be traced over the whole surface of the tumor. In most places it was normal, and rested upon fibrous tissue, beneath which in many places there were a few striated muscle-fibres. In other places the neoplasm approached the surface, and was covered by only a thin layer of fibrous tissue and a layer of stretched epithelium four or five cells deep. The subepithelial connective tissue was here and there

FIG. 2.



the seat of a moderate round-celled infiltration. In no place was there any sign of its invasion by epithelium from the surface. Beneath these coverings was the neoplasm, which was not sharply defined from the overlying fibrous tissue, as prolongations from the latter penetrated the substance of the new growth, and became continuous with its fibrous elements.

The mass of the neoplasm was traversed by delicate processes of fibrous tissue, barely sufficient in most places to furnish support to capillary bloodvessels. These processes, by their disposition, gave the sections an irregular, recticular appearance. Between these fibrous processes were cells with an abundant protoplasm and from one to four distinctly vesicular nuclei. The majority of these cells were round, but a few spindle-shaped and some irregular cells were also present, the latter owing their shape apparently to compression. The round cells ranged in size from 9μ to 30μ in diameter, and a few, which were vacuolated, measured 45μ in diameter. Here and there among these cells were a few leucocytes with dense, nearly homogeneous nuclei. The photomicrograph fairly represents the general appearance of an average field amplified 270 diameters.

In 1892 Max Scheier (*Berliner klinische Wochenschrift*, p. 584) collected the published cases of sarcoma of the tongue, of which there were twenty, established by microscopical examination. To that number should, perhaps, be added two cases not very fully reported in the *Guy's Hospital Reports*, 1890, xlvii.

Of these reports, only one dealt with a large round-celled sarcoma. It was reported by E. Mercier, in the *Revue Médicale de la Suisse Romande*, 1889, p. 250. The tumor occurred in a man thirty-six years old, and had been growing for eight years. It was on the dorsum of the tongue, in the median line, the size of a nut, and pedunculated. It was covered by hypertrophied papillæ, and was an inch in diameter both antero-posteriorly and transversely. The microscopical examination showed the tumor to be composed of large cells of various forms, with from one to several large nuclei. At the periphery of the tumor, in the midst of the lobules formed by it, were bundles of muscular fibres and delicate nerves displaced by the proliferating elements of the neoplasm. Mercier says of this case that it is probably unique in the literature of tumors of the tongue.

Since 1892 no cases of lingual sarcoma appear to have been reported.

NOTE.—After the above report was sent to press I had the good fortune, through the courtesy of Dr. Stilling, of the Cantonal Hospital, Lausanne, to obtain a piece of the sarcoma of the tongue removed by Dr. Mercanton, and reported by E. Mercier. In structure it differs from the present tumor in being less distinctly alveolar. The cells are also more spindle-shaped, and there is more intercellular stroma than in the tumor now reported.

CARNEGIE LABORATORY, NEW YORK, March 2, 1894.

NEUROTIC VOMITING.

By Robert T. Edes, M.D.,
of Boston.

Vomiting is not a disease or even a symptom of disease of the stomach, nor any proof of the abnormality of its contents. It is a special and complicated reflex, involving the abdominal muscles, the diaphragm, as well as the muscular coat of the stomach, especially its cardiac orifice, with often vasomotor and sensory irradiations having but little to do with the primary object of the act, which is, of course, to empty the organ usually, but not always, at the bottom of the whole disturbance.

It is true that the sensory irritation which sets in motion these varied actions usually comes from the stomach, and that its occurrence must always arouse, as the first thought in diagnosis, a suspicion of something wrong with the viscus or its contents. It is well known, however, that in a considerable minority of cases the act may be provoked by a sensory irritation starting from any one of many points other than the gastric mucous membrane, or sometimes even originating, so far as we can see, in the vomiting-centre of the medulla oblongata itself.

The vomiting of Bright's disease is, perhaps, not the best proof of the correctness of this remark, for it is possible that a portion of the hypothetical poison may be secreted by the walls of the stomach, as has been found to be the case with some metallic irritants, for instance, tartar emetic; so that the act, which is apparently central vomiting, may really be taking its origin in the more common way.

It is, on the other hand, not only possible, but highly probable, that the poison of uræmia, whatever it may be, exerts its action directly upon the centre itself, as occurs with some other emetics, notably apomorphia.

Instances of this kind of vomiting, or in most persons a condition not going beyond the abortive sensory stage—*i. e.*, nausea—are to be found in the effects of disgusting sights, sounds, and smells. It is probable that in sea-sickness we have a reflex originating in the semicircular canals of the inner ear disturbed in their function as organs of equilibrium.

I do not know whether to place here or among the instances of purely cerebral vomiting the case of a former colleague, who used to tell me that he could not read more than ten examination books at a time without making him sick at his stomach.

Slight mechanical irritation of the fauces will often greatly assist or occasionally entirely replace, as an initiatory stimulus to vomiting, the irritation of the stomach. That this is something different from ordinary painful irritation of the same region is shown by the fact that it may be inhibited by bromide of potassium without abolishing the susceptibility to the latter.

One of the most common, most important, and best recognized of the forms of vomiting not immediately attributable to a disorder of the digestive tract is the vomiting of pregnancy, and that occurring at times in connection with other affections of the uterus. It is generally recognized by obstetricians that treatment directed to the uterus and nervous system is more likely to be successful than that based upon the condition of the organ apparently chiefly at fault.

Considering, on the one hand, the ease and frequency with which the single, or occasionally repeated, act of vomiting, may take place, and how often its effect is a conservative or beneficial one, it is not strange that it should excite no alarm, but often be looked upon as desirable. It is, however, more to be wondered at that long-continued, obstinate, nervous, or functional vomiting should have received so little attention from systematic writers. In most works on general medicine but little is to be found beyond the mere statement that such a state of things may occur, with perhaps a more detailed description of "anorexia nervosa," which, however, is not exactly the same thing, and may be accompanied by little or no vomiting. One hardly finds a hint of its sometimes severe and even fatal results. The obstetricians are, however, better aware that the condition is not of so slight importance.

Ewald, indeed, reports one fatal case in which, however, he surmises that a tumor may have been present in the medulla, causing, together with the vomiting, an abnormal frequency of pulse, and the epileptiform convulsions which occurred shortly before death. Beyond this he does not speak as if the prognosis usually *quoad vitam* were really serious, and says that "the general nutrition suffers surprisingly little." This optimistic view is, in by far the larger number of cases, the correct one, but not always so.

Löwenfeld says that "the severest conditions of inanition develop themselves. This severe form of hysterical vomiting is most frequently met with in pregnancy, and has in single cases led to fatal results. Fortunately, it is generally possible, when the condition of the patient threatens to take a bad turn, to put an end to the vomiting in some way or other." He adds in a footnote: "Guyot reports a case of hysterical vomiting in a non-pregnant patient lasting eighty-two days and terminating fatally."

Two erroneous impressions, not, perhaps, distinctly formulated, but tacitly received, lie at the bottom of this neglect. One is that, when persistent, vomiting must be dependent upon organic disease, chronic gastritis, ulcer, or carcinoma; the other, that if the absence of chronic disease can be clearly established the case has entirely lost the gravity of its aspect and the prognosis has become that of other functional disturbances, which, however annoying, do not seriously threaten life.

But neurotic vomiting does not stand, as regards its influence upon

the economy, upon the same level as many other neurotic phenomena of similar origin and apparently greater severity. Coma, paralysis, and convulsions make a profound impression upon the lay bystander, but excite comparatively little alarm in the physician who is confident of his diagnosis of the absence of all organic disease. These may rapidly and completely disappear, leaving no permanent ill effects and without having seriously threatened life. But it is otherwise when a process, in itself just as causeless, so to speak, just as capricious, and, in its earliest effects, as harmless as that which gives rise to these more startling symptoms, affects the central organ of nutrition. A commander may look with comparative equanimity upon a raid or skirmish in his front, no matter how vigorous or noisy, when he would feel a well-founded anxiety were it directed upon his line of supplies. If the stomach empties itself thoroughly and inevitably whenever food is put into it, the system is deprived of its support just as surely when a perfectly healthy organ is being acted on by hypersensitized nerve-centres, as when a mucous membrane, rendered oversensitive by inflammation or a malignant growth, is the starting-point of a reflex which in itself is strictly normal and physiological. If the blood fails to receive its peptones, sugar, and fat, it must be just as surely impoverished, whether its loss be on account of the digestive glands having lost their power, or because they have been deprived of material to work upon by a capricious nervous system.

Fortunately in the great majority of cases it is true that the rejection of food is not constant and complete, and enough is retained not only to sustain life, but to justify the remark of Ewald just quoted. If, however, this lucky failure does not take place, then the result is inevitable, and calling a patient hysterical does not enable her to live without food.

There are cases in which no diagnosis of organic disease can be sustained, and in which, moreover, many positive signs of functional disturbance are present, which not only place the patient in a condition of extreme inanition, but may lead to a fatal result.

Case I.—Mrs. C., aged forty-one years, was seen twice in consultation with Dr. Bragdon, of Dorchester. She had had for more than a year persistent vomiting with what she called "fermentation"—that is, vomiting of acid material. There had been during this time one or two intermissions. On one occasion some blood of unknown origin had been brought up. The vomiting took place without reference to the time of eating. All sorts of diet had been tried. There were absolutely no cerebral symptoms, and there was no reason to suspect the kidneys. At the second visit the stomach was washed out with a flexible tube, with no result except the return of the water poured down and a little matter tinged with bile.

She emaciated and died.

At the autopsy the lungs were found to contain small cheesy deposits. The heart was small, but otherwise normal. The stomach showed

nothing abnormal; the pylorus was unobstructed. The kidneys and other organs were normal.

CASE II.—Miss C., always delicate and subject to sick headaches. Five years ago a pain began in the right side. Two and a half years ago her health began to break down entirely, with insomnia, headache, and "stomach-trouble." Soon after this an enlargement of a Fallopian tube was diagnosticated, and removal of one ovary suggested but not carried out. Some of the symptoms yielded to treatment, but the pain continued higher up, supposed to be due to old peritonitic adhesions. There were spells of "stomach-trouble," in which she was unable to digest or retain anything for five days at a time. In January, 1889, her diary informs us that she was suffering from insomnia, headache, "stomach-trouble," and on January 22d speaks of a "sharp, cutting pain in the extreme left side of the stomach" as a "new symptom." During this period she was going to parties and receiving calls in the intervals of distress.

In February "lost ground." She felt that she was not going to get well.

In March a diagnosis of cancer of the stomach and then of gastritis was made. There was obstinate vomiting. She took no food or drink except from time to time to "rinse out her stomach" by swallowing a glass of water, and then without an effort throwing it up again at once.

During this period she once took a little broth and a minute piece of fish, which were thrown up again undigested thirty-six hours afterward.

There were some thirty days preceding her death in which, with the slight exception just noted, no food was taken except by enema, although she was vomiting in small quantity.

Her mind during her whole sickness was perfectly clear until two days before death, when she fell into a mild delirium. I saw her two or three times with Dr. D. W. Prentiss, of Washington. She was then in a state of great emaciation, her condition remaining about as above described. There was never any vomiting of blood. The bowels were regular. The urine contained no albumin, but was highly concentrated, containing, a few days before death, 32 grammes of urea to the litre; but as the quantity per diem was not known, the total daily elimination cannot be given. It was presumably very small.

At the autopsy the body was found much emaciated, but with some fat still remaining in the omentum. The heart and lungs were normal, but containing very little blood.

The stomach contained no tumor and no ulceration. There were some congestion of the vessels and some ecchymoses undoubtedly originating about the time of death. It was nearly empty, with no large amount of mucus, presenting no extraordinary appearance to the naked eye, the mucosa seeming to be intact. This was confirmed so far as naked-eye examination of small pieces removed and hardened went, but the microscopic preparation was delayed a long time and was finally a failure.

The intestines had fecal contents. In the lower part of the large intestine were white masses, undoubtedly derived from enemata of milk. The liver was normal; the gall-bladder full of dark, thick bile. Pancreas normal. Spleen not enlarged. The kidneys were congested, but otherwise normal.

The right semilunar ganglion was apparently normal in the midst of undefined connective tissue; the left not found.

The uterus was anteflexed, the tubes normal, ovaries flabby, with no corpora lutea. There was no trace of previous inflammation of the uterus, its appendages, or of the peritoneum.

The nomenclature of such cases as these is not altogether a matter of indifference, inasmuch as it may have some influence on the mind of even the practitioner, and if not very carefully contrived is likely to lead to harmful misunderstandings between him, his patient, and her friends. Until it is possible to relieve the words "hysterical" and "nervous" from a certain flavor of disapprobation and suspicion which still clings to them, or until we ourselves get rid of the habit of prefixing, at least mentally, the word "only" to these names, they should be used very carefully.

"Hysterical" in the oldest sense of being connected with uterine disturbance they may or may not be, and those which are so are probably, as being more amenable to local treatment, not the very severest type. Neither of these two cases seems to have possessed the old-fashioned hysterical disposition. The second, though evidently of an affectionate and emotional character, was calm and cheerful in her bearing and seldom gave way even to tears.

In neither was uterine disease found, and in the second the traces of a tumor suspected, of dilated tubes, and of uterine disease said to have been cured by electricity, were looked for in vain.

On the other hand, there were no manifestations of the "grand hysteria" of the *Salpêtrière*.

But "hysterical" in the sense of purely functional and neurotic they undoubtedly are in the same sense that joints are "hysterical" in many cases where they are non-usable and painful, and limbs paralyzed and contractured, and the skin when it takes on certain vasomotor conditions simulating eruptive diseases, or the subcutaneous connective tissue when the extremities become blue and swollen, and so on.

It is to be regretted, in the interest of completeness, that the special "stigmata" were not sought for; but the diagnosis, though it might have received some confirmation from their presence, does not depend upon them.

If there is any lesion in such cases, it must be in the brain, and of such a character as not to be seen by processes yet discovered.

The practical point in the diagnosis is, whether or not organic disease be present; and this is to be determined chiefly by an exclusion, as far as possible, of inflammation, malignant disease, and especially of ulcer, being confirmed perhaps by the presence of other and distinct signs of the neurotic diathesis. It should be remembered, however, that neither ulcer nor cancer is a protection against the neuroses. In one of these

cases the attending physician, a practitioner of large experience and sound judgment, who had studied the case thoroughly and exhausted the resources of medicine and careful feeding, firmly believed in the existence of malignant disease until he actually saw the stomach at the autopsy.

It might be suggested, since no examination of the head was made in this second case, that there was a lesion of the medulla oblongata so circumscribed as to give rise to the symptoms of gastric pain and vomiting, and no other. It can only be said of this hypothesis that such a state of things is conceivable in the abstract, but that no such case has been reported, and it is in the highest degree improbable that even one case should go on to a fatal result without a single other manifestation of cerebral disease; and when two such in the observation of one person are called for to sustain this theory the probability becomes too small to be considered.

The doubts in diagnosis, which fortunately can never be resolved in the present instance, are illustrated by

Case III.—Seen in consultation with Dr. J. L. Hildreth. This patient was a delicate-looking, light-complexioned girl, with a distinctly neurotic family tendency, who had worked hard and distinguished herself in her own education and had then become a teacher, besides sharing in family anxieties.

Two years before the present illness she had had a distinct attack of melancholia. With this exception, she was well until August, 1892, when, being at the time tired and weak, but resting in the country, she began to vomit. She got better and went to work again, but in December was again taken with vomiting and was obliged to keep in bed. The vomiting was persistent and for a long time resisted all treatment. She lost flesh and strength, although she had but little pain. There was no hæmatemesis. A temporary improvement took place in January, following upon the administration of small doses of codeine; but the former condition soon returned and was aggravated, so that not the smallest portion of food could be retained. The tongue became red and dry, the pulse small and rapid, the emaciation extreme, and she presented every appearance of rapidly approaching death by inanition, which for some hours her attending physician supposed to be close at hand.

This, however, seemed to be the turning-point. She soon took and retained a small amount of champagne, and, later, milk and lime-water, which latter was increased with considerable rapidity, so that when she entered the Adams Nervine Asylum she was fairly convalescent, and went on to complete recovery, gaining flesh rapidly and having no symptoms of any special interest except to herself. There was no gastralgia, very little that could be called even dyspepsia, and but slight nervous manifestations, except a good deal of exaggeration and tendency to self-inspection. During the whole time there were no specially hysterical manifestations and her mind was perfectly clear.

The diagnosis of such cases is obviously the important and for an efficient treatment the fundamental one. It is true that the great

majority of cases would of themselves come to a satisfactory conclusion after a greater or less time of any treatment, and, of course, under such as would be directed toward organic disease; that is, so far as the dietetic management is concerned; but the time and anxiety consumed would be greater than if a less careful treatment were supplemented by other measures directed to the nervous condition. Hence the diagnosis, even if it cannot be always absolutely certain, should be made as nearly so as possible.

There is no symptom specially characteristic of functional vomiting. The presence of other neurotic symptoms, either together with, or even more conclusively if ceasing in order to give way to, an attack of obstinate vomiting, would not be proof positive perhaps, but in the highest degree suspicious.

The absence, during considerable time, of vomiting of blood would be a strong point in favor of a neurosis; but when it is remembered that a moderate hemorrhage into the stomach may not be thrown up at all, but pass away, possibly unnoticed, by the bowels, we are again left at fault.

On the other hand, repeated vomiting of blood would be more conclusive of organic disease than anything else, except the finding of an epigastric tumor. A single occasion of hæmatemesis, even if copious, is of much less value. Hysterical hæmatemesis is not very rare, and may or may not be a vicarious menstruation. If repeated at regular intervals, its purport would at once be evident.

As to the assistance to be gained by an analysis of the stomach-contents vomited, or withdrawn by the tube, we find that, unfortunately, the hydrochloric acid is increased in nervous gastralgia as well as in ulcer. Complete absence of free acid has also been seen in cases of nervous dyspepsia, and might obviously lead to the suspicion of cancer. I know of no observation made in a case of exactly the kind described above, that is, where the vomiting is a much more prominent symptom than the pain; but it is possible that a persistent absence of hyperacidity, together with the painless vomiting, would be a significant combination.

Dr. Routh remarked in one of the discussions on the subject that hot drinks increased the pain of ulcer, but repressed that of neuralgia.

Ewald gives an elaborate table of the distinction between nervous gastralgia, gastric ulcer, and gastric cancer, which I forbear to quote, since its value is so heavily discounted in the immediately following remark: "I hope that this table may be of some service in establishing a differential diagnosis. However, sharp as the distinction between the three pictures may appear on paper, we find often enough in practice that just the most important symptoms are absent, or so combined with one another, or so vaguely manifested, that an exact diagnosis cannot possibly be made."

In the third case here reported the physicians who saw it were agreed that the weight of evidence lay upon the side of nervous vomiting, and this view seems to have been confirmed by the rapidity and completness with which recovery took place after it had once begun. The essential points were chiefly the absence of vomiting of blood and the occurrence of the whole affair as a consistent part of a distinctly neurotic history. If, however, one should choose to affirm in a similar but less carefully observed case, that bloody stools had already been present but not seen, and that the neurotic symptoms were the consequence of anæmia rather than *vice versa*, it would be difficult to confute him.

Of diseases other than those of the stomach, which might easily present symptom-groups simulating nervous vomiting, there are two which deserve mention, Bright's and intracranial tumor; but the possibility of either of these being associated with persistent vomiting having been recognized and the case investigated from that point of view, the chance of error would be extremely small.

In a case of hysterical anuria the presence of urea in the vomitus would have a value in the diagnosis if any confirmation were needed. Pelvic complications are to be sought for and remedied. In special and favorable cases this may be the end of the matter, as in the vomiting of pregnancy; but local uterine treatment is no more universally successful in this than in other neuroses, so that its failure would prove nothing as to diagnosis.

Dr. Bristow (*Lancet*, June 20, 1885) makes the highly important observation that in some cases the so-called vomiting is in reality regurgitation, and cites the case of a girl who brought up even the smallest quantity of food. He was satisfied that the food swallowed did not reach the stomach and was arrested at the lower end of the œsophagus. She was cured by a single passage of the tube.

The treatment of neurotic vomiting presents few points of interest, so far as drugs and diet are concerned, from that employed to check vomiting from other causes. Almost any of the medicines called gastric sedatives or antiemetics may prove useful, but nothing is specific.

In the matter of diet, it is perhaps less easy to find some one article which will always be well borne than when the vomiting depends upon organic disease. It is, however, desirable not to make the search too limited, for the appetite may be capricious, and the choice will depend more upon it than upon chemical composition. Any physician can tell queer stories of what patients can and cannot eat or think they cannot. The hospital patient, who has been carefully fed by the rectum or on predigested milk or the like dainties, steals his neighbor's fried ham and eggs and thrives thereon. The consumptive's stomach, which has for days rejected the most ingenious and artistic concoctions, quiets down under the indigenous baked bean, only to be again aroused by a

delicate and very expensive bean-flour called "Revalenta Arabica." The next effectual sedative is a piece of good solid pound-cake.

Articles of diet called "bland" are by no means more universally acceptable to the sensitive or disgusted palate than a smile of the same character is to the perturbed spirit.

Variety and "little and often" are two good principles to bear in mind; but there is no rule which will not be found to have important exceptions.

The more food-preparations of any kind the physician is familiar with, the better. One may be retained when another is rejected, not because it is better but because it is new.

The most important part of the treatment is by no means the easiest to formulate; I mean the moral control and psychical stimulus or sedation.

It must combine firmness with kindness, caution with boldness, and the whole with fertility of resource, common sense, and adaptability to the case in hand.

The act of vomiting is, to a certain very limited extent, directly under the control of the will; but much more completely is it, together with the whole process of digestion, indirectly subject to nervous influence.

How easy is it to disgust a sensitive person with any article of food by some unpleasant detail as to its source or the method of its preparation. It is certainly consonant with the views of hysteria held by some theorists that a fixed idea or some incident forgotten as to the ordinary consciousness, but retained in the "subliminal," may be constantly exciting the centres controlling the action of the stomach. In the second of the cases reported it is more than probable that the idea of the patient that she was not going to get well had a good deal to do with determining the result.

If a patient believes that she must vomit, she will do so. If, on the other hand, there are no nerve-endings in the gastric mucous membrane irritated by inflammation or neoplasm, no cells in the medulla to be compressed or poisoned, assurances that she need not and must not vomit are of more value than bismuth, creosote, or ice. One gentleman proposes to check hysterical vomiting by the simple plan of bringing no basin.

Here, of course, is where the diagnosis is of supreme importance. The physician cannot give those hearty assurances of recovery with convincing vigor, nor exercise the necessary firmness in urging food, if he has a feeling that the patient may at any moment bring him to shame by a hemorrhage or a perforation, or her confidence be slowly undermined by the gradual development of a growth in the epigastrium.

He can feed her so as not to do harm in either case, and sometimes it may be that this is for a time all, until the diagnosis is established;

and it is not necessarily any imputation upon the diagnostic skill of the practitioner that he may be obliged thus to temporize. It is not, however, until he can cut loose from the very limited bill of fare and assure his patient that the lactated milk or the malted glucose, to which her faith is pinned, is not her only hold upon life, and that it is time for her to enlarge her diet, that he is really reaping the benefit of a positive diagnosis.

Measures which appeal to the reason or to the imagination as being appropriate to the relief of stomach-trouble may have, from the force of suggestion, an efficacy much beyond their intrinsic value. "The experience of Kaltenbach,[1] Alt, and others shows that by appropriate suggestive treatment the vomiting in the severest cases of hyperemesis can be checked. Kaltenbach and Alt washed out the stomachs of their patients, and then suggested that since everything harmful had been removed the vomiting must necessarily cease. This suggestion proved efficacious and the patients recovered completely. Whether such suggestive treatment would be easier and more effectual with the patient in a condition of hypnosis I do not undertake to say. My belief would be that if it could be made efficacious at all in a non-hypnotized person the effect would be much more durable.

THE AREA OF THE MURMUR OF MITRAL STENOSIS.[2]

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The region in which the murmur of mitral stenosis is ordinarily heard is well known, and is generally described as limited sharply to the mitral area or its immediate vicinity. Through several years past it has been the writer's lot to meet with a comparatively large number of cases of this disease, and to have the conviction more and more impressed upon him that the murmur, although usually confined to the region of the apex, is not at all infrequently heard much beyond the ordinarily prescribed limits. In these cases the murmur has oftenest occupied the mitral area, and has extended thence in a narrow, tongue-shaped band upward and to the left into the axilla. In other cases it was audible in an area much greater than this; and it is instances of the latter sort which have finally lead to the report of the observations.

The fact that this murmur can be audible beyond the usual limit is, of course, not at all new; and reference to it, with details of cases, might

[1] Löwenfeld: Neurasthenie und Hysterie, p. 436.

[2] Read before the Association of American Physicians, May, 1895.

with reason be judged entirely superfluous were it not for the fact that there is for the most part such a uniformity of description in most modern text-books regarding the area in which the murmur of mitral stenosis can be heard, and that this description so generally ignores or denies the possibility of it being audible beyond the narrow confines of the apex. It is on this account that the writer would venture to call the attention of the members of the Association to the matter.

As a matter of fact, a number of the members have already, in various text-books, put themselves on record with regard to it, some defining the narrow confines of the area of the murmur, others implying these at least, since they fail to refer to the possibility of any other seat than the one usually given, and very few—but two were found—referring to the rare occurrence of a wider distribution.

No extended search through other modern text-books was made, but those which were at hand failed with tolerable uniformity to speak of the murmur of mitral stenosis as audible anywhere but at or near the apex. Thus Vierordt (*Medical Diagnosis*, 1891, p. 228) says it is always strictly confined to the left border of the heart. Petit, in the article in the *Traité de Médicine*, vol. v. p. 25, at least implies that it does not extend far to the left of the apex, although the language is not quite clear; Leube (*Specielle Diag. der innere Krank.*, 1891, 22) says merely that it is heard at the apex; Fagge (*Practice of Medicine*, p. 70) states that it is limited to the apex, and Sansom (*Cyclopædia of the Diseases of Children*, vol. ii. p. 829) says that the murmur disappears suddenly away from the neighborhood of the apex. The article of Potain and Rendu in the *Dictionnaire des Sciences Médicales* ("Cœur," p. 585) does make the statement, however, that it is not rare for the murmur to be heard toward the region of the axilla, and Bristowe (*Practice of Medicine*, 1876, p. 480) says that it is very rarely audible at the back or at the base.

As we go slightly further back in medicine the possibility of a wider transmission than is now ordinarily admitted seems to be better recognized. To quote only two authors, Walsh (*Diseases of the Heart*, 1862, Amer. ed., p. 91) says that the murmur is "conducted in the same directions, although less extensively, as the mitral systolic murmur;" and Hayden (*Diseases of the Heart and of the Aorta*, 1875, p. 905) admits the possibility of it being heard, though only faintly, beyond the ordinary strict boundaries of the apical region. He reports in all 81 cases of mitral stenosis, and says that in these he has heard the murmur in the back in only 1 case and in the axilla in 3 cases.

Briefly, then, the position which the writer assumes, is that the area ordinarily described in which the murmur of mitral stenosis is audible is the correct one for the majority of cases, but that the murmur can quite often be heard more widely diffused than this, and that this

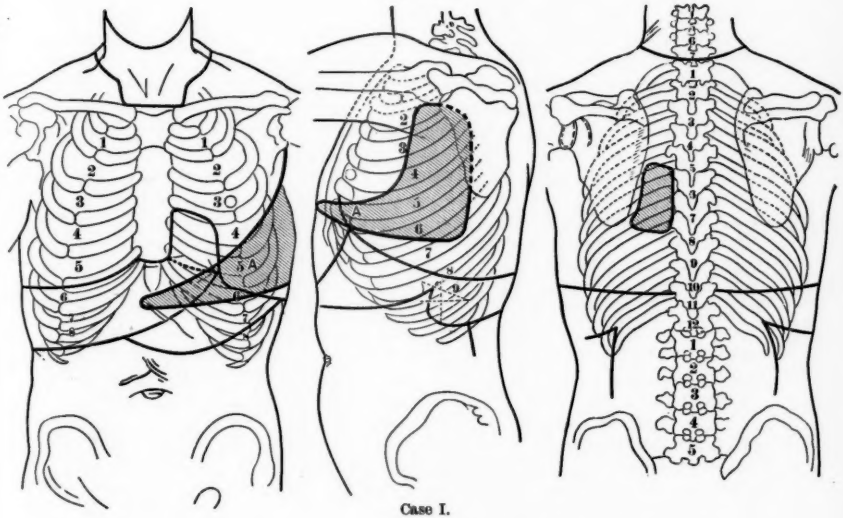
fact should be recognized and mentioned by teachers and writers on the subject.

That the extensive area of audibility of the murmur is more frequently present than is supposed, even by those who have admitted its possibility, is indicated by the fact that the following 7 cases have all been examined within the last three months. In 3 of them the murmur was audible in the back, in 1 it extended two and a half inches beyond the left posterior axillary line, in 4 it reached the posterior axillary line, and in 2 the mid-axillary line. In all it was audible very high in the axilla.

For the sake of greater clearness the case-histories include diagrams showing the area in which the murmur could be heard in each case.

Case I.—William L., aged about twenty-three years. Since childhood had never been able to run well. Got out of breath easily. When first seen, toward the end of January, 1895, had been having evident symptoms of loss of compensation of the heart, with dyspnœa, palpita-

Fig. 1.



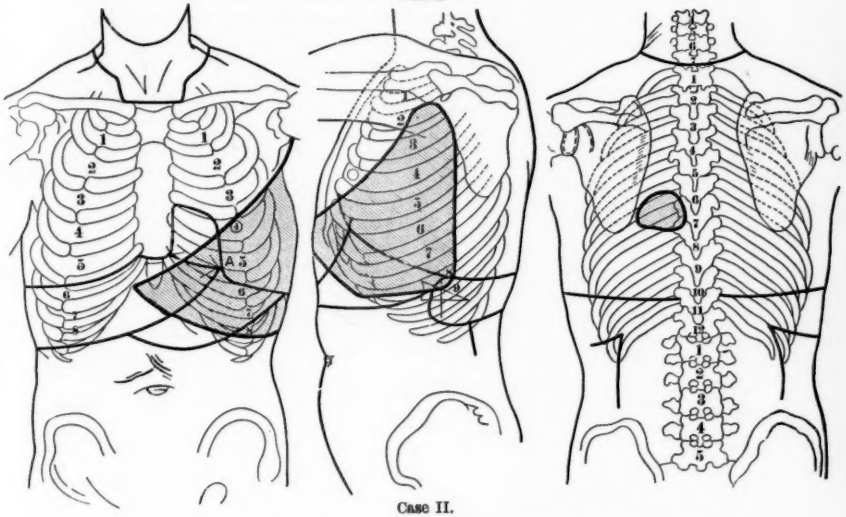
Case I.

tion, troublesome cough, and some degree of œdema. Improved in a remarkable way under treatment. Came for further examination on March 29, 1895. An abstract of the notes made at that time read as follows: Pale and delicate-looking. Chest long and narrow. Nipple in third interspace; apex-beat in fifth interspace an inch outside of the nipple-line; cardiac dulness, third rib; thence to second right interspace just at edge of the sternum; thence down the right edge of the

sternum. To the left it reaches one inch to the left of the nipple-line. Whole breadth six inches. There is a decided prominence of the left costo-sternal articulations, especially the third, fourth, and fifth, apparently the result of long-continued pressure of the hypertrophied heart. Apex-beat forcible, heaving. Pulsation also over base, but not seen over the right auricle. (There was, as I remember, a very marked thrill, but no note was made of it.) A loud diastolic murmur is audible, with maximum intensity over the apex. It occupies nearly all the diastole and ends abruptly with the first sound, is rough and purring in character, and is heard loud up to the fifth rib, where it stops with striking suddenness. Thence the limit of its area extends obliquely down to the right to one inch below the xiphoid cartilage. Here it makes a sharp curve on itself and returns to the left costal margin, leaving a strip about one inch broad. It runs back along the left costal margin to the nipple-line; thence it follows the sixth interspace, crossing the seventh rib in the mid axillary line and touching the seventh interspace two and a half inches behind the posterior axillary line. Thence it goes straight upward to the edge of the scapula, thence nearly horizontally to the right to high in the axilla just below the junction of the arm with the chest; thence obliquely down to the right to the fifth rib. The murmur is heard very distinctly as far as the mid-axillary line, but only faintly beyond this. The whole breadth of the area is twelve inches, the height about four inches At the back, between the edge of the scapula and the spine, is another area, almost but not quite continuous with the former, in which the murmur is faintly heard. A systolic murmur, smooth and comparatively faint, is heard in an irregular circle five inches in diameter, whose centre is a little above and to the left of the xiphoid cartilage. The pulmonary second sound is accentuated. No murmurs can be heard at the aortic cartilage or in the neck.

Case II.—Samuel B., aged twenty-six years. Examined March 21, 1895. Complains of abdominal pain; swelling after eating, belching, and other symptoms of indigestion. Well-nourished man, whose business makes him walk a great deal. Questioning elicits the existence of palpitation and dyspnœa on slight exertion, apparently dating from an attack of grippe the year before. No cough, but occasionally pain in the chest. No œdema. Examination shows heart's action irregular; forcible pulsation in epigastrium and at apex. Apex-beat in fifth interspace within the nipple-line; a distinct diastolic thrill at apex felt as far as the mid-axillary line. Cardiac dulness, third rib; right edge of sternum; nipple-line. A low-pitched, very rough murmur, occupying nearly all the diastole and running into the first sound, is heard with maximum intensity at apex. It is heard upward to the nipple, thence obliquely downward to the right costal margin below the level of the xiphoid, thence obliquely downward to the left costal margin in the nipple-line, thence obliquely upward to the ninth rib in the posterior axillary line, thence upward to high in the armpit, and thence obliquely downward to the nipple. The area is ten inches transversely and six inches in height. The murmur is also heard faintly between the angle of the scapula and the spine. No other murmurs can be discovered. The pulmonary second sound is accentuated. Both sounds over aortic cartilage are feeble; over sternum loud. First sound forcible and valve-like at apex. Pulse small.

FIG. 2.

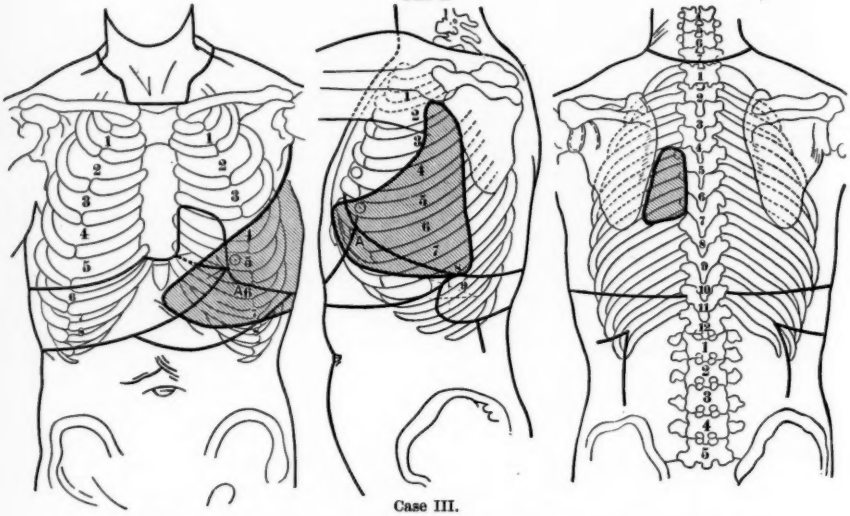


Case II.

CASE III.—Jennie S., nine years old. Slightly built and undersized. Previous history and history of other diseases unknown, except that she had been an inmate of the Children's Hospital at different times during the greater part of two years, suffering from very severe cardiac symptoms which often threatened life and at other times were largely quiescent. There had been repeated nose-bleed, intense cardiac pain, congestion of the lungs with fever, great dyspnœa, palpitation, but no or but little œdema. Examinations of the heart were made at various times, all corresponding for the most part in their result. In May, 1894, the examination showed: Bulging præcordium; wide, heaving impulse; apex-beat best felt in sixth interspace in the nipple-line; distinct diastolic thrill. Boundaries of the cardiac dulness were the second rib slightly to right of right edge of sternum; fully one inch to left of the left nipple-line. The auscultatory symptoms were much as at the final examination made in March, 1895, at a time when the child was playing about the ward and was in very good condition. The notes of this examination read as follows: At apex, which is in the sixth interspace one inch outside of the nipple-line, there is a loud, roaring murmur occupying all of the diastole, followed by a loud systolic murmur. The latter is transmitted into the axilla. The diastolic murmur is transmitted downward from the apex to the costal margin, thence transversely to the left to the posterior axillary line in the eighth interspace, thence high into the armpit, thence obliquely downward to the nipple in the fifth interspace, thence obliquely to the xiphoid cartilage, and thence finally to the left costal margin. The horizontal breadth of the murmur is five inches, and the height three and a half inches, a very large area in a child no larger than the ordinary size of six or seven years. The maximum intensity is at the apex and in the eighth interspace in the axilla. The murmur is audible between the spinal column and the edge

of the left scapula. No murmurs heard at the aortic cartilage or in the neck. Second sound much accentuated at the pulmonary cartilage, and a systolic murmur heard there.

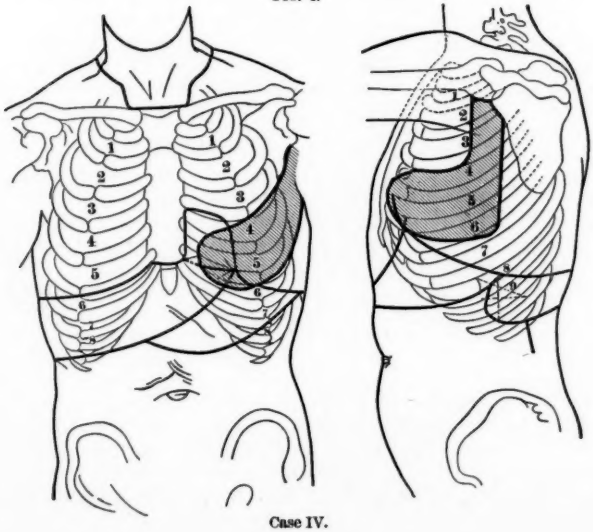
FIG. 3.



Case III.

CASE IV.—Mary M., aged twenty-one years. Rheumatism four years before; dyspnœa and cough for a year. Present complaint is

FIG. 4.

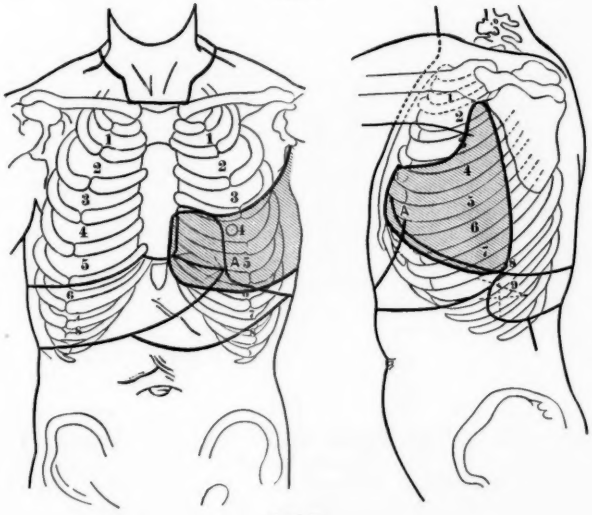


Case IV.

great dyspnœa, with some pain about the heart. Various physical examinations of the chest were made with varying results as to the number of murmurs present, although a mitral diastolic murmur was always found. Examination on March 16, 1895, gave: Diastolic thrill over the apex and præcordium. A very characteristic rough, low-pitched murmur, occupying the last half of the diastole and running into the first sound, is heard at the apex and in the mitral area, and is also transmitted into the axilla, reaching to the left as far as the posterior axillary line, and extending high into the armpit. This upper portion of the area reaches forward to the right from the armpit only as far as the anterior axillary line. The murmur is not heard in the back. The first sound at the apex is sharp and valve-like and free from murmur. Pulmonary second sound accentuated. No murmur at xiphoid cartilage. Aortic second sound clear. Faint systolic murmur at aortic cartilage. Circumstances prevented a careful outlining of the cardiac dulness, but previous examinations had noted it to be increased. On April 30th the murmur was found to be audible posteriorly as far as before, and to extend downward as far as the seventh interspace.

Case V.—Jennie H., aged ten years. May 13, 1895. Complains of palpitation, chiefly on exercise. Was perfectly well until last Easter,

Fig. 5.



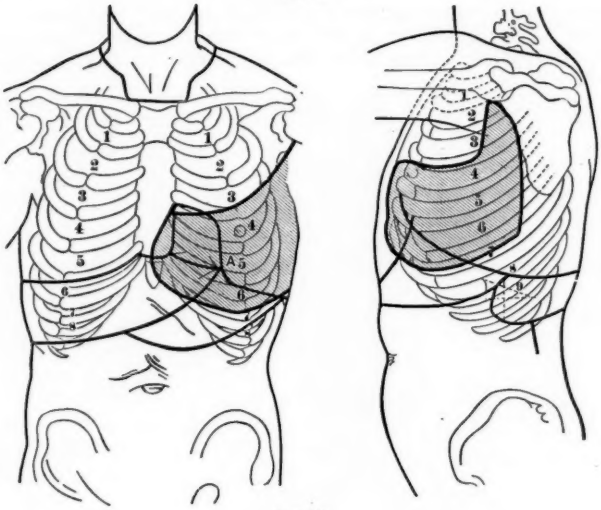
Case V.

at which time had some pain over the heart, and other cardiac symptoms began. At present has a severe cough. No history of other diseases. Examination shows: Forcible heaving impulse over whole præcordium. Apex-beat in fifth interspace, nipple-line. Diastolic thrill at apex. Cardiac dulness, third rib; right edge of sternum; three-quarters inch outside of left nipple-line. Total breadth, four and a quarter inches. Low-

pitched murmur at apex, occupying last half of diastole, and running into louder systolic murmur. The systolic murmur is transmitted loudly to axilla, pulmonary cartilage, and back. The diastolic murmur reaches upward to the fourth rib, thence transversely to the left edge of the sternum, thence down to xiphoid, thence across to the sixth interspace in the left nipple-line, thence posteriorly as far as the eighth rib in the mid axillary line, and thence high into the armpit and down to the right to the fourth rib as stated. It is not heard in the back. At aortic cartilage the second sound is clear, and there is a faint systolic murmur transmitted into the neck. Pulmonary second sound accentuated.

CASE VI.—William S., aged thirty-one years. Rather delicately built man, at present in comparatively good health, but cannot walk rapidly without palpitation and dyspnœa. Well as a boy, and active as anyone, but had rheumatism when twenty-three, and then began to get

FIG. 6.



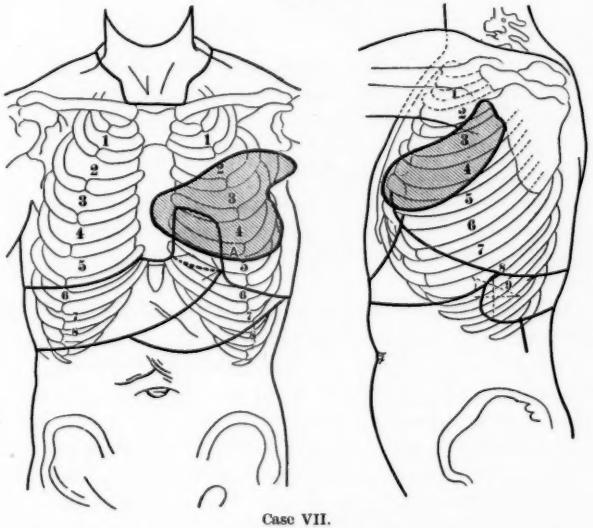
Case VI.

short of breath, to have palpitation, and sometimes cough. He had hemorrhages so often that he grew weak, and friends thought he was going into consumption. Examinations on many different occasions gave always a pure mitral diastolic murmur. At the last examination, April 30, 1895, the following note was made: Apex-beat in fifth interspace one and a half inches within the nipple-line. Nipple in fourth interspace. Forcible pulsation at apex and distinct diastolic thrill there. Cardiac dulness, third rib; right edge of sternum; nipple-line. A long, loud, rough murmur, heard loudest at the apex, occupies nearly all the diastole and runs into the first sound. It extends upward to the fourth rib above the nipple; thence nearly horizontally to one-half inch to left of mid-sternum opposite fourth interspace, thence

downward for four inches to xiphoid cartilage; thence in a curve down and to the left along the costal margin to three inches to the left of the median line, thence obliquely upward in the seventh interspace as far as the posterior axillary line, thence straight upward to the edge of the armpit, thence into armpit as high as the stethoscope will go, thence obliquely downward to the right to the fourth rib as stated. High in the armpit it is very distinct, but at the other boundaries is faint. It is not heard in the back. The whole breadth of the murmur is about nine inches, and its height seven or eight inches.

Case VII.—The following case was obscure in some points, inasmuch as the suspicion existed at one time that a pericarditis was present, while there also seemed some indication of an aortic regurgitant murmur. Both of these would obscure the diagnosis of mitral stenosis. The repeated examinations, however, convinced me of the presence of mitral stenosis, and the concomitant symptoms supported the opinion.

Fig 7.



Case VII.

To avoid confusion, only the notes regarding the mitral stenotic murmur will be reported:

Katherine H., about ten years old, had had repeated rheumatic attacks. Evidence of heart disease for at least six years. Chief complaints had been dyspnœa, palpitation, and for a few weeks severe cough. When first examined in January, 1895, the præcordium was prominent; apex-beat best felt in fifth interspace in the nipple-line; thrill immediately before the impulse. The boundaries of the cardiac dulness were, third rib; right sternal margin; nipple-line. Auscultatory sounds confusing, but a systolic and a diastolic mitral murmur were evident. The last examination, made in March, 1895, was as follows: At apex a systolic murmur with clear second sound, the latter imme-

diately followed by a somewhat irregular diastolic murmur. The diastolic murmur is transmitted faintly high into the armpit, just below the arm, thence to the second left interspace in the anterior axillary line, thence to the third left interspace close to the sternum, thence to the mid-sternum opposite the fourth interspace, thence downward and to the left to the apex. It is loudest at the apex in the fifth interspace, nipple-line. It is not heard at the xiphoid cartilage, and here the second sound is clear. It is not heard in the back.

MENINGOCELE TREATED BY PLASTIC OPERATION.

By A. W. Mayo Robson, F.R.C.S.,
SENIOR SURGEON, LEEDS GENERAL INFIRMARY; PROFESSOR OF SURGERY IN THE YORKSHIRE COLLEGE OF THE VICTORIA UNIVERSITY; AND MEMBER OF COUNCIL OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

If guided by certain text-books, the surgical student might be led to think that the excision of a meningocele, either connected with the spine or the skull, is an operation so heroic as to be unjustifiable.

This is evidently a survival of the preantiseptic era and with certain reservations may be disregarded.

In a paper read before the International Congress at Rome and illustrated by a series of 20 cases, I stated my views very fully with regard to spina bifida, many of the cases related being examples of meningocele.

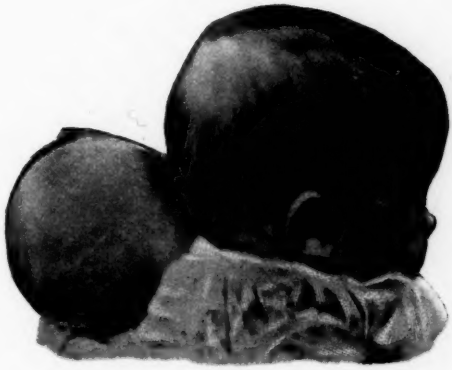
The only really serious difficulty in operating on a cranial meningocele is that occasionally a portion of the nerve-centres may be contained in the sac, but this may usually be diagnosed by careful palpation with or without a preliminary aspiration of the sac. At times this complication may be difficult to determine, as the cerebellar protrusion may be so small and so soft as to be with difficulty felt. This uncertainty need not, however, prevent an exploratory operation, for if after reflecting a flap of the integuments near the base of the tumor a small incision just large enough to admit the finger be made into the meningeal sac, this can be effectually closed if it be deemed unwise to proceed further with the operation. In a case of this kind I found the cerebellum lying in the sac and attached by a long pedicle. Not feeling justified in performing a physiological experiment by removing the cerebellum, I sutured the small incision by separate meningeal and skin sutures, and the child recovered, to be again brought by the mother three months later with a request that I would remove the tumor at all risks; which, however, after a consultation with my colleagues, I declined to do. In simple meningocele there is usually a distinct neck to the meningeal sac, which can be ligatured after the integuments have been dissected

off; the skin-flaps can then be sutured separately, so that the ligatured neck of the sac lies out of the line of the superficial sutures.

In the cases in which I have operated primary union has been the rule, and recovery from operation has not only been satisfactory, but the after-development of the children has not been impaired.

The following case is a good example, and the illustration shows the size of the tumor dealt with:

FIG. 1.



N. H., aged six months, in good general health and otherwise well developed, was brought to the General Infirmary at Leeds with the occipital tumor as shown in Fig. 1; the history being that at birth the swelling was only the size of an egg, and that it had increased rapidly, especially during the previous two or three weeks.

At first the swelling was pale on the surface, but of late it had become red and inflamed. On admission the tumor was translucent at the fundus, and the coverings were inflamed over an area of several inches, though the redness stopped short of the base of the swelling, which was very tense, the tension being increased when the child cried.

From the rapid increase in size, the attenuation of the coverings, and the inflammation of the fundus, it was quite manifest that unless curative measures could be adopted the end must come within a short time. Permission for operation was therefore asked and readily granted. The tumor was shaved and asepticized by 1 in 40 carbolic dressing, applied for a few hours before operating.

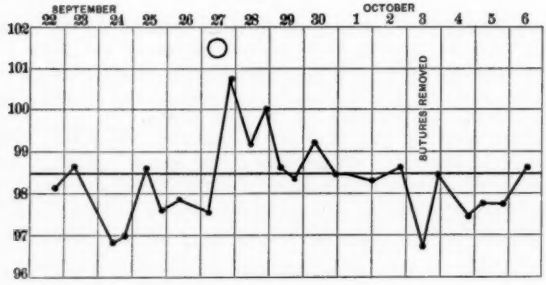
September 27th. A mixture of chloroform and ether was administered, and a curved incision made through the skin on the left side of the base of the tumor so as to form a flap; a small exploratory incision was then made through the meningeal wall of the sac, when fifteen ounces of clear cerebro-spinal fluid escaped; the finger was inserted, and it was found that the opening into the skull was quite free and about ¼ inch in diameter; the skin-incision was therefore continued round the base and the meningeal pedicle freed, the latter was

ligatured with a fine silk suture, and the tumor was removed by an incision just beyond the ligature, which was then cut short. The integumental flap was then brought over the pedicle and fixed *in situ* by silkworm-gut stitches.

FIG. 2.

The after-progress was perfectly satisfactory, as shown by the temperature-chart. The child took the breast soon after the operation, and apparently experienced no discomfort. The sutures were removed on the sixth day, when the wound was found to be healed, and the patient was discharged cured on the ninth day. When heard of some time afterward it was well and thriving.

FIG. 3.



This operation, I feel sure from ample experience, is one which can be recommended in a class of cases otherwise hopeless; but unless the operator is prepared to take every pains, both in the details of the operation and in the observance of antiseptic precautions, the older rule of non-interference had better be observed.

NOTES ON BACILLUS COLI COMMUNIS AND RELATED FORMS,

TOGETHER WITH SOME SUGGESTIONS CONCERNING THE BACTERIOLOGICAL EXAMINATION OF DRINKING-WATER.

(From the pathological laboratory of the Bureau of Animal Industry of the U. S. Department of Agriculture.)

By Theobald Smith, M.D.

In the following pages are brought together a number of forms belonging to the species *B. coli communis*, as well as a variety of closely related forms which have been the object of so much attention and discussion during the past few years. They have been studied as carefully as time permitted and certain general relationships outlined which may be of service to future systematists. Attention has been specially directed toward their behavior in fermentation-tubes containing sugar-bouillon. The sharp distinctions brought out by this procedure between many of these forms on the one hand and *B. coli* and *B. typhosus* on the other are, to say the least, a relief from the uncertainty of the usual potato-culture and the variable intensity of the indol-reaction. These distinctions are emphasized in the following pages not for the purpose of making them the sole basis of classification, but to call attention to the necessity of applying the fermentation-test more accurately than has been done hitherto. A careful perusal of these pages will, I believe, convince the reader that the ordinary means of determining the production of gas are all but useless in the differentiation of related forms.

In several former publications[1] the writer has pointed out the value of the reaction of bacteria in the presence of carbohydrates as a means of differentiation. This is now generally conceded. All that is needed is to apply this test more precisely. In the fermentation-tube, when carbohydrates are present, the diagnostic characters exhibited by bacteria are not exhausted by the production of gas. There should always be taken into consideration:

1. The evolution of gas as to (*a*) total quantity, (*b*) rate of accumulation, (*c*) approximate composition, (*d*) temperature most favorable.
2. Formation of acids.
3. Behavior toward different carbohydrates.

This scheme indicates on the surface a large amount of work. As a matter of fact, there is little more work involved than in the exhaustive study of an ordinary bouillon-culture. The handling of the tube itself requires a little more care, but if the various minor suggestions laid down in the article above referred to are heeded, no difficulty will be experienced.

The writer is fully aware of the fact that since his first publication on the use of the fermentation-tube much has been done in determining

more fundamentally the changes induced in carbohydrates by bacteria.* The chemical work involved is too extensive, however, for the rapid differentiation of species and varieties. The fermentation-tube furnishes unequivocal characters promptly while permitting the comparative simultaneous study of a series of cultures with little trouble.

In the application of the test with bouillon containing carbohydrates other than the most easily attacked glucose or dextrose a difficulty arises which hampers us to a certain extent. Most beef (and the flesh of other animals as well) contains a fermentescible substance acting like dextrose. In testing with dextrose this does not interfere. When, however, other sugars are to be employed only that bouillon should be used in which gas does not appear during the multiplication of some gas-producing bacterium. The dextrose free beef I have encountered in about one-fifth of the beef purchased. Recently I have found the flesh from cattle in advanced stages of tuberculosis, those that show signs of emaciation, free from sugar. Such bouillon should be set aside and used only with saccharose, lactose, or other sugars, excluding dextrose. Beef placed in boiling water immediately after slaughter has also been found free from fermentescible substances.

The fermentation-tests referred to in this article were all made at the temperature of 36°–37° C., unless it is otherwise stated. This is important, as the amount of gas produced varies with the temperature. This may be most abundant at 37° C., or at 20°–25° C., according to the species under observation. With *B. coli* the higher temperature is the most favorable. With some related forms it is the lower temperature. This is illustrated by some observations recorded in the tables.

The use of the fermentation-tube may be briefly summarized in the following steps:

1. The preparation of peptonized beef-broth in the ordinary way.
2. The preliminary test for sugar in two or three fermentation-tubes with *B. cloacæ*.†
3. If found producing gas, it may be used for dextrose-, but not for saccharose- or lactose-bouillon. Should other bouillon be not at hand, it may be used with other sugars, provided the species to be studied is tested in the bouillon containing no added sugar and the quantity of gas produced carefully noted and deducted from the total gas produced after sugars have been added.
4. The sugars should be added in the proportion of one per cent.

THE COLON-GROUP.

The importance of *B. coli communis* in pathology has been insisted upon for some years past. The frequent isolation of colon-bacilli from

* For some of the literature on this subject see (1).

† See table on pages 298 *et seq.* Nos. 34, 35, and 36.

the diseased human and animal body is sufficient to account for this attitude. It has been claimed to be the cause of typhoid fever, diarrhœal diseases of infants and adults, various affections of the urinary tract, and peritonitis. In animals it has been regarded as the cause of abortion in cows, Texas fever, septicæmia in fowls, and has been confounded with the hog-cholera group of bacilli.

Whether the colon-bacillus is or is not the cause of some of the lesions with which it has been found associated is not to be answered at the present time, nor does it require an answer or even a discussion in this place. It is sufficient to note that it frequently penetrates into the body during life to induce us to treat the group with a certain dignity which it does not deserve otherwise.

Its relation to hygiene is defined by its frequent presence in water. For a number of years the writer has regarded the presence of *B. coli* in water as a valuable indication or symptom of pollution. This indicator has been looked upon by some as of little value. How far the one or the other position shall prove to be the acceptable one future work must decide.* Arguments for or against the significance of the colon-group both in the body and in water can only be properly dealt with when all shall have agreed upon what is to be called *B. coli communis* and when the related forms shall have been assigned to their proper place. It is one of the main objects of this paper to suggest a standard and to stimulate further research into intestinal bacteria in accordance with this standard until we know definitely what species or varieties are true inhabitants of the digestive tract and what species are there temporarily and really belong elsewhere.

The distinguishing characters of *B. coli* have been presented by different writers in different ways. Having been studied mainly in comparison with the typhoid bacillus, its characters have been defined with the latter as a standard. Other things being equal, *B. coli*, according to Escherich, produces gas in solutions of sugar and coagulates milk. C. Fränkel considered it non-motile. Chantemesse and Widal looked upon the gas-production in lactose-bouillon as diagnostic. Kitasato regarded the indol-reaction as an important differential character. It would be going wholly beyond the scope of this paper to discuss all the writings upon the colon-group. Only those can be noticed which bear directly upon the subject of the paper.

Achard and Renault,[3] in endeavoring to differentiate bacteria of this group, obtained from the urinary tract, tried the method of sowing one form upon a substratum which had previously served for the growth

* The fact that *B. coli* is an even more prolific inhabitant of the intestines of certain domestic animals (determined by the writer in a series of unpublished studies in 1889 and 1890, and since then by others[2]) does not destroy the value of *B. coli* as an indicator of fecal contamination, for hygiene has no justification whatever for considering the intestinal contents of the higher mammals and birds as entirely harmless to man.

of another form. If development took place, the forms were regarded as belonging to different types. By this procedure five types were found. These types varied furthermore in their behavior in lactose-bouillon and milk and toward the indol-test.

The criterion thus established by these authors seems scarcely to deserve the importance attached to it. That it may serve as one of the means of differentiation cannot be gainsaid. Yet it should be borne in mind that a slightly increased sensitiveness to acids or alkalies may be at the bottom of this criterion, a sensitiveness which may be variable among the varieties of the same pathogenic species.[10]

Gilbert and Leon,[4] in endeavoring to group colon-bacilli, paid special attention to their motility, their behavior in lactose-bouillon and in milk, and toward the indol-reaction. They discuss quite thoroughly the application of these tests, and point out gradations in the intensity of the indol-reaction. They fail, however, with all other observers, to perceive that colon-bacilli are all active when examined from young surface-colonies in gelatine. They conclude by describing the type colon-bacillus as a motile, non-liquefying bacillus, giving a rich yellow growth on potato, fermenting lactose-bouillon, coagulating milk, and giving the indol-reaction.

This definition covers the ground very well, and includes the two varieties—one fermenting saccharose, the other not, as defined by the writer in the following pages. It should be stated, furthermore, that with some varieties of potato no growth may appear in the thermostat. Again, the fermentation-reaction in lactose-bouillon is inadequate, and the definition of the species as given by these writers is saved from total wreckage by the addition of the positive indol-reaction, as may be seen by an examination of the tables given below.

Perhaps the most exhaustive study of bacilli resembling *B. typhosus* and the colon-group was made by Germano and Maurea[5] in Kruse's laboratory. These authors made use of a variety of tests, including the observation of motility, behavior in jequirity solution, litmus whey, production of alkali in peptone-bouillon, reducing action, the Gram stain and the gas-production in 2 per cent. glucose-, saccharose-, and lactose-agar. This painstaking work, in which 100 cultures are submitted to these tests, does not aid us in defining the different varieties of the colon-group, but simply in distinguishing them from the typhoid bacillus. In the published list there are fifteen forms (several are cultures of *B. typhosus*) producing no gas in any sugar, thirty producing gas in three sugars, nineteen producing gas in glucose- and lactose-agar, and one producing gas only in glucose-agar. The rest are characterized indefinitely as producing a little or a moderate quantity of gas in one or the other of the agar-tubes. This might be traced to muscle-sugar in some cases in which bubbles appeared in saccharose- and lactose-agar. The total

quantity of gas produced and the relative amount of CO_2 are, of course, not determinable in agar. An important character, namely, the reaction of the sugar-agar when gas is not formed, is not given. This important work is not criticised for what is determined in it, but only for what might have been found out with little extra trouble concerning the colon-group.

Fremlin[6] in comparing colon-bacilli from different sources employs glucose-bouillon only. The motility is also not well defined.

Ury[7] examined *B. coli* and the bacillus of Friedländer, and comes to the rather antiquated conclusion that they are different.

Beckmann[8] finds in ground-water not exposed to pollution typhoid-like bacilli which ferment glucose and coagulate milk after a variable period. These are called *B. coli*. They might as well be ranged under *B. cloacæ* so far as the meagre description goes.

In order to establish a type-species of *B. coli communis* I would suggest that those forms be regarded as true to this species which grow on gelatine in the form of delicate bluish or more opaque whitish expansions with irregular margin, which are actively motile when examined in the hanging drop from young surface-colonies taken from gelatine plates, which coagulate milk within a few days; grow upon potato either as a rich-pale or brownish-yellow deposit, or merely as a glistening, barely recognizable layer, and which give a distinct indol-reaction. Their behavior in the fermentation-tube must conform to the following scheme:

Variety *α*. One per cent. dextrose-bouillon (at 37° C.).

Total gas, approximately 1/2; H/CO_2 approximately 2/1; reaction strongly acid.

One per cent. lactose-bouillon:

As in dextrose-bouillon (with slight variation.)

One per cent. saccharose-bouillon:

Gas-production slower than in the preceding, lasting from seven to fourteen days. Total gas finally about 2/3; H/CO_2 nearly 3/2. The final reaction in the bulb may be slightly acid or alkaline, according to the rate of gas-production.

Variety *β*. The same in all respects excepting as to its behavior in saccharose-bouillon. Neither gas nor acids* are formed in it.

In the table *B. coli α* and *β* from a variety of sources are represented. One of them (No. 14) did not give the indol-reaction, and is therefore, strictly speaking, to be ranged under another variety. Besides these a number of other provisional groups are included in the table, which, with the exception of the *B. lactis aërogenes* group, might be regarded as belonging either to the colon-group or to the typhoid group. The

* Throughout this publication an acid reaction signifies the distinct reddening of litmus-paper not changed by the drying of the paper or the boiling of the fluid. The reaction of the open bulb of the fermentation-tube is referred to.

colonies on gelatine are all of the coli type, and all are actively motile forms of about the same size. They were included in the table because the ordinary microscopic and cultural characters failed to distinguish them from these two types. Before referring briefly to the salient features of these intermediate forms, it is desirable to point out once more briefly the fundamental difference between *B. coli* on the one hand and the large hog-cholera group (including *B. enteriditis* and *B. typhi murium*) and the typhoid bacillus on the other. The fermentation-reaction of the hog-cholera group (16a of the table) is as follows:

One per cent. dextrose-bouillon: total gas 1/2; H/CO_2 2/1;* strongly acid reaction; 1 per cent. lactose-bouillon: no gas or acids; 1 per cent. saccharose-bouillon: no gas or acids.

The hog-cholera bacillus, while identical with *B. coli* in its behavior in dextrose-bouillon, differs wholly from the latter in having no effect on lactose (and milk) and saccharose.

The typhoid bacillus (28a) differs from both:

One per cent. dextrose-bouillon: no gas, markedly acid reaction;† 1 per cent. lactose-bouillon: no gas, no acid reaction;‡ 1 per cent. saccharose-bouillon: no gas, no acid reaction.

The use of lactose-bouillon alone is not sufficient as a distinguishing character between typhoid and pseudo-typhoid forms, for the whole hog-cholera group and many other forms fail to act upon lactose.

BACILLI RESEMBLING B. COLI COMMUNIS.

A species which is of considerable interest is No. 16:

Bacilli morphologically like *B. coli*, in active motion when taken from fresh gelatine surface-colonies and examined in water. On potato a yellowish deposit or none, according to the potato used. Milk coagulated in about eight days. The reactions in sugar-bouillon are as follows:

Dextrose-bouillon, identical with *B. coli*.

Saccharose-bouillon, no action.

Lactose-bouillon, *no evolution of gas, but markedly acid reaction.*

This species thus lacks the power to evolve gas in lactose-bouillon, though it still retains the power to form acids from the sugar, and hence to coagulate milk.

* The figures are throughout this article to be regarded as merely approximate. Slight variations in the quantity of gas produced may occur in parallel cultures of the same organism.

† The action of this bacillus on dextrose is usually not recognized because gas is not formed. As pointed out by Perié[9], it forms acids from dextrose sufficient to coagulate milk. Anyone may try this by adding some sterile dextrose solution to milk and inoculating with the typhoid bacillus. Within a week the milk will be solid.

‡ In a former article (*Centralblatt f. Bacteriologie*, xi. 367) I stated that the reaction of saccharose- and lactose-bouillon inoculated with typhoid-bacilli is transiently acid. This is an error due to the use of bouillon not free from muscle-sugar. A transient acidity in such bouillon is common to a large number of bacteria.

A slightly aberrant group of apparently wide distribution, as I have frequently encountered it in well-water, is the following (Nos. 17, 18, and 19):

Bacilli in form, size, and motility like *B. coli*. Surface-colonies on gelatine plates differ slightly from those of *B. coli* (but not invariably) in the earliest stages of growth. They are roundish, slightly convex patches, with peculiar radial, linear markings on the disk, which now and then remind one of hair combed from a central point outward. These markings may disappear partly or wholly under artificial cultivation. In the later stages of growth these colonies expand into irregular patches not distinguishable from those of *B. coli*. Milk is coagulated in four or five days. On potato growth may be yellowish or not recognizable (tested but once). The fermentation-reaction is peculiar:

Dextrose-bouillon: no evolution of gas; reaction acid.

Saccharose-bouillon; no evolution of gas; reaction unchanged.

Lactose-bouillon: gas approximately 1/2; H/CO_2, 2/1 or 3/1.

This species has thus no power to produce gas in dextrose-bouillon, and in this respect resembles the typhoid bacillus. It fails to act upon saccharose. In lactose-bouillon its behavior is practically like that of *B. coli*. To this statement one exception must be made. The gas appears quite tardily. The earliest bubble does not appear for several days, and may be delayed nearly a week. With *B. coli* most of the gas appears within twenty-four hours, and all within three or four days. In one of these forms, the only one tried, multiplication on potato appears to be more vigorous at 20° to 25° than at 37° C. Fermentation-tubes should be kept at least a week before they are rejected in order that the retarded appearance of gas may not be overlooked.

This species would come under the designation of *B. coli* if judged according to standards hitherto employed. It coagulates milk and produces gas in lactose-bouillon, the fluid chosen by Chantemesse and Widal. But besides its different behavior toward dextrose it does not produce indol. Its occurrence as an intestinal form has not been demonstrated, nor can it be correlated with forms already described until the gas-test is more thoroughly applied.

TRANSITIONAL FORMS.

In the table a number of cultures are thus designated, because they stand near to those forms already described in their behavior toward sugars, or else because they approach the pseudo-typhoid and the true typhoid bacilli in producing either a very little or no gas.

Thus, No. 20 is morphologically like *B. coli*, but its colonies have the markings of the preceding group in the earliest stages. Milk is coagulated in five days. On potato an abundant straw-colored layer is formed. In dextrose-bouillon it produces only a little gas at 37° C.,

and becomes distinctly acid. Upon saccharose it has no effect. In lactose-bouillon the reaction becomes strongly acid. When the fermentation-tubes are kept in the laboratory temperature the gas formula changes materially. This suggests that a lower temperature is the more suitable for this species.

No. 21 is also a peculiar species as regards the gas-test. The gas formulæ at 37° C. and at 20° to 25° C. are quite different from each other.

No. 22 stands very close to the hog-cholera group. The behavior in lactose-bouillon, in which a little gas is set free, is significant as marking the dividing-line, for I have never observed even a trace of gas in the hog-cholera group. It will be noticed that the action on milk-sugar is too feeble to produce any change in milk.

No. 23 is identical with the group described above (Nos. 17–19) in producing gas only in lactose-bouillon. It acts upon the other sugars also in producing acids. While it resembles these forms in some characters it differs from them in others (non-motility, fleshy form of colony) and approaches the lactis aërogenes group.

Nos. 24 and 25 form a distinct group as regards the gas-reaction, but differ from each in their behavior in milk and toward the indol-test. The colonies resemble those of *B. coli* for a time. Later on, the margin of the expanded surface-colony becomes quite regularly scalloped.

PSEUDO-TYPHOID BACILLI.

These are naturally of much interest, as they resemble typhoid bacilli in not producing even a trace of gas in sugar-bouillon. Three of these were isolated (Nos. 26, 27, and 28), and these differ from each other in certain characters.

No. 27 resembles *B. coli* in the form, size, and motility of the bacilli. On gelatine-plates the surface-colonies expand into patches of irregular outline. In the earlier stages of growth both deep and surface colonies may have strands of wavy lines running radially across the disk. These are not constant, however. Bouillon becomes quite turbid. Milk is not changed after one or more weeks in the thermostat, but is coagulated when boiled.

On potato the growth varies. In the thermostat no growth appears. In the temperature of the laboratory, however, an abundant, colorless, glistening growth appeared after some days, distinguished from the now rosy-colored potato only by the relief and the glistening. Gas is not evolved. The reaction in dextrose-bouillon is pronouncedly acid, in lactose-bouillon feebly so, and in saccharose-bouillon alkaline.

No. 26 differs from the preceding form in some respects. The colonies have no characteristic markings; *i. e.*, they resemble *B. coli* closely. The growth on potato is yellowish or cream-colored, and the reaction of saccharose-bouillon acid.

No. 28 stands nearest to the true typhoid bacillus. It was isolated from a city well, the bacteriological examination of which did not indicate much, if any, fecal contamination. The colonies of this form expand like those of *B. coli*. A visible growth on potato was not observed at 37° C. The behavior in bouillon containing the three sugars is identical with that of the true typhoid bacillus; *i. e.*, there is no gas formed, and the reaction of the dextrose-bouillon only becomes acid. Milk-cultures remain unchanged even after boiling.

This form differs from the genuine typhoid bacillus in a more vigorous growth in gelatine and in a much less persistent motility in culture-fluids. In bouillon a cohesive condition of the deposit was noticed after one or more weeks. That this form is not the recognized typhoid bacillus may thus be conceded. However, it would be impossible to state that it may not be one of the varieties of this pathogenic species. The study of such varieties, if any exist, is, in spite of the work of Babes, still in its beginnings. If the writer were to use his experience gained in the study of a closely related group of pathogenic organisms, he should say that No. 28 could not be positively excluded from the genuine typhoid bacilli, since variations within the hog-cholera group itself have been found to be quite wide.[10]

B. LACTIS AËROGENES.

The failure on the part of many observers to note the motility of *B. coli* has led to the confusion of this group with the *B. lactis aërogenes* group. The latter is frequently referred to in bacteriological publications, and appears to hold the same enviable position with *B. coli* in the production of various forms of disease. This group should, therefore, be subdivided, and the various forms, brought together under it, defined more rigidly. That there is ample reason for such differentiation is shown below.

The cultures which I have regarded as coming under this group are non-motile bacilli, distinctly plumper and perhaps a trifle shorter than *B. coli*. In young cultures they are mere ovals. The surface-colonies on gelatine-plates are distinguished from those of *B. coli* in being fleshier, slightly convex, and having smooth, abrupt borders. They are, in other words, distinctly disk-shaped, and when allowed to expand fully in gelatine rolls protected from drying they frequently appear like lids provided with a central knob. The colony is not cohesive. The platinum needle readily breaks it up. This is due to the existence of a distinct capsule, or at least capsular substance usually recognizable on the border of the hanging drop by a regular spacing of contiguous bacilli. When roll-cultures stand upright the large colonies may flow partly down the sides of the tube and raise the suspicion that the gelatine is being slowly liquefied, which is not the case.

These bacilli are all gas-producing, and the formulæ vary considerably. Thus, for No. 29 the gas formulæ for dextrose- and lactose-bouillon are precisely like those for *B. coli*. Neither gas nor acids appear in saccharose-bouillon. On potato a rich, yellowish growth is formed. Milk is firmly coagulated in a few days. The indol-reaction is positive. Were it not for the morphology this bacillus would be ranged under *B. coli*.

A species represented by Nos. 31, 32, and 33 is quite different from the preceding in its physiological characters. It ferments the three sugars and starch. On potato there is formed an exceedingly rich pale-yellow or ashen growth, not cohesive. The potato becomes much discolored, and gas bubbles may appear. Milk is coagulated promptly in twenty-four to forty-eight hours. The gas-production differs from that of any of the species described. In dextrose-bouillon the total gas is 5/6 to 6/6; *i. e.*, up to 100 per cent. The ratio H/CO_2 is nearly unity, the volume of hydrogen slightly predominating. The acid reaction is feebler than in the colon-group. When the fermentation is somewhat retarded the open bulb may be alkaline after the close of the fermentation. When gas collects more rapidly the reaction does not become alkaline. The gas-reaction for saccharose and lactose is the same as that for dextrose. The gas-reactions for starch have not been studied.

A slightly aberrant form (No. 30) was found in spring-water, and perhaps derived from the manure of animals frequenting it. The potato-growth is identical with that of the preceding, but the coagulation of milk proceeds more slowly, not being completed for five or six days. The gas-reactions are likewise different, approaching those of the colon-group:

In dextrose-bouillon, total gas 1/3; H/CO_2 3/1; reaction acid.

In lactose-bouillon, total gas 11/12; H/CO_2 3/2; reaction acid.

In saccharose-bouillon, total gas 2/3; H/CO_2 2/1; reaction acid.

From these figures it will be seen that the total gas-production is less and the relative amount of hydrogen greater than in the preceding species. Here, again, is illustrated the fact frequently noted by the writer that where gas is evolved the intensity of the acid reaction is proportionate to the relative amount of hydrogen set free.

Forms similar to the members of the group as described above were encountered in the intestine of the pig, and have been compared among themselves and with B. Friedländer in a former publication.[11] * The same variations are there noted. The gas-reactions as given are not strictly correct, however, as the bouillon used was not free from muscle-sugar.

* Denys and Martin have made similar comparative studies recently: Sur le rapport du pneumo-bacille de Friedländer, du ferment lactique et de quelques autres organismes avec le *B. lactis aërogenes* et le *B. typhosus*. La cellule ix. (1893) p. 261. (The original not obtainable by the writer.)

A peculiar form already referred to is represented by No. 23 of the table. It possesses the morphological character of the lactis aërogenes group in being short, plump, and non-motile, and provided with a capsule or at least capsular (zooglœar) substance, recognizable in masses of bacteria from a colony. The latter is fleshy, round, grayish-white, and not viscid. Milk is coagulated in two or three days. On potato its growth remains invisible. It produces gas in lactose, but not in glucose or saccharose bouillon. These fluids are made distinctly acid, however. The type of gas-production in lactose-bouillon is like that of *B. coli*.

Before concluding this portion of the work it is desirable to call attention to a species very frequently encountered, by the processes given below, in surface- and well-water polluted as well as unpolluted. This species is represented by Nos. 34, 35, and 36 of the table. These bacilli are perhaps a trifle smaller than *B. coli*, and more nearly resemble the hog-cholera group. Their motility is more persistent than that of *B. coli*. They differ from the latter in some important characters. They slowly liquefy gelatine, the gas-reaction is wholly different, and indol is not produced. Nevertheless, they may be mistaken for *B. coli* in hurried determinations, because the liquefaction on plates owing to its retarded appearance may be entirely overlooked if the plates are allowed to dry out rapidly. Even in gelatine-tubes the liquefaction may not appear in one or two weeks. If, moreover, agar be used with the various sugars in place of the fermentation-tube the peculiar gas formula will not be recognized, and the chances of error in diagnosis increased. From the table it will be noticed that in dextrose- and saccharose-bouillon the gas drives out the fluid almost entirely, and the CO_2 always predominates over the hydrogen. The gas formula in lactose-bouillon is variable, owing to the slow accumulation of gas. V. A. Moore[12] has found this species (or group) frequenting rusty spots on Indian corn. This fact strengthens the hypothesis held by the writer that the habitat of this species is vegetation, living and dead.

A few words may be added here concerning the correlation of certain culture-tests, such as that of lactose-bouillon and milk. It may be laid down as a general rule that if acids are produced in the former the latter will be coagulated either spontaneously or after the application of heat. Both tests are necessary to supplement each other. The lactose-bouillon informs us whether any acids are produced, the milk the intensity of acid formation. This may vary somewhat even for the same culture, and the production of acids in milk may be overlooked unless lactose-bouillon be used at the same time. In a recent study of a mouse septicæmia (or swine erysipelas) culture the writer was led to assume that this culture might coagulate milk because it invariably produced a pronouncedly acid reaction of lactose-bouillon. Several tests in milk showed that when the cultures were boiled they might or might not

become coagulated. This variability may depend on the initial acidity of the milk or upon the vigor of the culture used.

The variable behavior of potatoes as culture-media has been the subject of such frequent comment that I may well pass it by, noting simply the fact that the potato may be utilized to test the action of bacteria on starch. The permanence of the acid reaction (especially of the water in the tube) may at least for the present be regarded as a sign that starch is being split up. If the potato-cylinder fits snugly into the test tube and dips into the water, any gas bubbles formed will become imprisoned between the potato and the sides of the tube. The cultures No. 31, 32, and 33 are evidently gas-producers in the presence of starch. This phenomenon may be witnessed by adding starch to glucose-free bouillon in the fermentation-tube before final sterilization. Gas-production from starch is also a property of the *B. cloacæ* group.

The brief sketch which I have given of a variety of forms which may be mistaken for *B. coli* shows that the fermentation-test must be applied at least as fully as I have used it in order that the colon-bacillus may gain more relief and distinctness. It is evident that the simple determination of gas-production in sugar-agar is wholly insufficient owing to the great variety of gas-producing bacteria. It is furthermore clear that neither lactose nor glucose bouillon by themselves define anything, and that at least the three kinds of sugar-bouillon must be used together. For the more accurate subdivision of saprophytes it will be necessary to extend the test to starch, and, perhaps, other carbohydrates, as has been done more especially by Frankland and those working under Duclaux.

The objection occasionally urged that bacteria lose the power of gas-production during artificial cultivation I have already met in a former publication[1] with convincing illustrations. At this date I have no reason to change the views expressed elsewhere that gas and acid-production are too fundamental characters to be lost. The effect of cultivation on gas-production for some groups is *nil*, for others the rate and quantity may suffer somewhat, but the production does not disappear. For a small number (Nos. 24 and 25 of the table), in which the amount of gas set free, when the bacteria were first isolated, was very small, the gas may or may not appear subsequently, according to partially known conditions, one of which is temperature. Such forms are probably transitional, whose acid-formula should be carefully studied. The amount of gas set free may vary slightly with the construction of the fermentation-tube, and the condition of the culture from which the tubes are inoculated. If this be old, partially dried out, there may be considerable variation in the total amount of gas. If, on the other hand, only fresh cultures are used, the variation from tube to tube is very slight. This may account for the statements now and then made of the inconstancy of gas-production, statements which may probably be refuted by one

passage of the culture through fresh media. In all these cases of temporary variation the formula H/CO_2 remains remarkably constant.

Besides the production or non-production of gases the appearance or non-appearance of acids in bouillon containing sugars merits our attention as of equal importance. Bacteria may produce acids with or without the evolution of gas, or they may leave the sugar untouched, in which case the reaction remains alkaline. The acid may be produced so slowly that it is masked by the alkaline tendency of bacteria in active multiplication. To this phase of the subject the writer hopes to return at some future date. It is in general sufficient to take the reaction of the fluid in the open bulb, as well as in the closed branch, before the tube is rejected, to cover all cases. In the table only the reaction of the open bulb is given.

The behavior of bacteria toward sugars in nutritive media is most probably a slow physiological adaptation to environment which affects a great variety of morphologically distinct forms and brings them nearer together. Hence it may be a guide to habitat and function rather than to descent. It is this adaptation which has probably brought members of the lactis aërogenes group so close to those of the colon-group that they have been considered as identical.* For the purposes of bacteriology, as applied to pathological and hygienic problems, it seems that the grouping according to function and bio-chemical activity is of most importance.

THE ISOLATION OF B. COLI COMMUNIS FROM WATER.

It has been the not unreasonable hope of bacteriology to find processes capable of revealing specific disease germs in water. While this problem may be regarded as solved in case of the spirillum of Asiatic cholera, it is far from solution in case of typhoid bacilli. Realizing for some years past the difficulties inherent in this problem on account of the presence of the colon-group in polluted water, I turned my attention to the latter as of possible use as an indicator of pollution. But even the detection of *B. coli* in ordinary gelatine-plates made from a small quantity of water is, as a rule, not possible, for the more contaminated a given water the richer the bacterial flora, which grows more rapidly than *B. coli* and soon liquefies the gelatine. Other special devices must therefore be brought into requisition. These are in the main the outcome of studies designed to reveal the presence of typhoid bacilli in water, and hence a brief reference to the latter will not be out of place.

Vincent[13] claims to have succeeded in finding typhoid bacilli, as well as colon-bacilli, by adding water to carbolized bouillon and cultivating the mixture at 42° C. Several passages may be necessary. Foote[14]

* See No. 29 of the table.

recommends agar-plates in which most bacteria are suppressed at 37° C. Wurtz[15] recommends agar to which lactose has been added, and which has been tinged with litmus. The colonies upon such a plate divide themselves into two great groups, those which act upon lactose, produce acids from it, and change the color of the colony to red, and those which fail to act upon lactose, and hence leave the blue color unchanged. The colon-bacilli will be found among the former, the typhoid bacilli among the latter. The great utility of this simple process has been strongly urged by Mathews[16] when the problem is to search for typhoid bacilli. Its usefulness in the quantitative estimation of fecal bacteria will be better known after the nature of the red colonies has been more exhaustively studied.

The difficulty of finding typhoid among colon-bacilli by the bouillon-method paves the way for the not unjustifiable suspicion that the frequently reported discovery of typhoid bacilli may have been in perhaps all cases the finding of pseudo-typhoid or colon-bacilli. This suspicion is voiced very recently by Grimbert,[17] who admits that it is impossible to find typhoid bacilli in the presence of the far outnumbering colon-bacilli. The writer some years ago found it impossible to isolate typhoid bacilli added directly to unsterilized water containing at the time about 300 bacteria in a c.cm.

The colon and related bacilli referred to in the table as coming from water were isolated according to two methods based upon that suggested by Rodet and G. Roux, and modified by Vincent. To flasks of bouillon containing about 100 c.cm. 50 c.cm. of water were added, the mixture quickly warmed and placed at 37° C. After sixteen to twenty-four hours gelatine-plates were made, and rarely more than one species found. When membranes appeared on the bouillon the flask was tilted and the fluid for the plates taken from the deeper layers. By this precaution *B. subtilis* and other liquefying bacilli were avoided. Carbolic acid was not added to the bouillon. The other similar process consisted in adding a small quantity of water to each one of a series of fermentation-tubes containing glucose bouillon and placing them in the thermostat.[18] The amount of water added depended on the probable amount of pollution, and varied from 0.1 to 1, or even more c.cm. If, after two or three days, any tube indicated the presence of *B. coli* by the quantity of gas formed, and the rate of evolution, plates were made from the deposit. Usually but one species, *B. coli*, appeared; sometimes two were found on the plates.

One objection to this method is the rapid destruction of bacteria in the strongly acid bouillon. Unless the isolation is attempted within a week, the fermentation-tube may be found sterile, or else some other spore-bearing bacillus taking the place of the colon-bacilli on the plate. These two methods have been used, since 1891, by the writer with much

satisfaction. The second has been adapted to the quantitative determination of the colon bacilli. If, for example, 0.5 c.cm. of water be added to every one of a series of ten fermentation-tubes containing 1 per cent. dextrose, and if in two of these the colon-type of gas-production appears, we may safely conclude that there were two colon-bacilli in the 5 c.cm. used.

It may be urged that the presence of two or more gas-producing forms may mask the indications of the fermentation-tube. But gas-producing bacteria are not so numerous as a rule, and in exceptional cases a second test may be made with smaller quantities of water. A series of mixed infections made by inoculating the same tube with *B. coli* and some other gas-producing species has convinced the writer that in nearly all cases *B. coli* maintains its own type. This is probably due to the large amount of acid produced by *B. coli* in the dextrose-bouillon, which inhibits the growth of other species. The final strength of this acid appears to be equivalent, approximately, to 0.3 per cent. of normal acid, as determined by titration of potassium hydrate, when phenolphthalein is used as an indicator.

It will be noticed that stress is placed only upon the presence of *B. coli*. The widely distributed *B. cloacæ* is excluded, also those forms producing less gas than *B. coli*, among them *Proteus vulgaris*. This division may appear somewhat arbitrary; but it errs, if at all, on the conservative side. The gas-formulæ of regular inhabitants of the intestines other than those of *B. coli* are not yet studied, and until more is known of their relative abundance, as compared with *B. coli*, the ultimate value of the qualitative test cannot be estimated. Schardinger[19, 20] is inclined to look upon the presence of fermentative (*i. e.*, gas-producing) forms of all kinds in water as indicative of pollution. This is true if, by pollution, we mean filth of any kind. For the movement toward pollution, especially of surface-water, seems to begin with the appearance of gas-producers which steadily increase in numbers with the amount of pollution.

The wide distribution of the colon-group has led some writers to regard *B. coli* of little value as a symptom of fecal contamination. At present the tendency seems to be in the other direction, and more attention is being paid to processes designed to reveal its presence. Kleiber[21] in a recent article recommends the addition of 2 per cent. carbolic acid to the mixture of bouillon and water. Burri[22] adds 0.75 per cent. of dry sodium carbonate to the culture-fluids. The high temperature of the thermostat, coupled with the strong alkalinity, is designed to suppress all but colon bacilli. Burri rightly suggests that the detection of fecal bacteria in a large quantity of water may lead to the condemnation of really good water. It is for the same reason that I regard quantitative methods of importance, and consider the inoculation of a series of tubes of more service than the addition of a large quantity of water to bouillon in a single flask.

	No.	Source.	Form of surface-colony on gelatine.	Motility	Gas-reaction in fermentation-tube containing one per cent. sugar-bouillon.									Potato.	Milk coagulated.	Indol-reaction.	Remarks.
					Dextrose.			Lactose.			Saccharose.						
					Total gas.	H CO_2	Reaction	Total gas.	H CO_2	Reaction	Total gas.	H CO_2	Reaction				
Bacillus coli communis.	1	River-water	Spreading	Motile	5/12	2/1	Acid	1/2	2/1+	Acid	1/2	2/1+	Acid	Yellowish	In 2 days	Positive	Nos. 1 to 8 inclusive produce gas in the saccharose. Nos. 9 to 15 inclusive do not produce gas in saccharose.
	2	Human feces.	Spreading	Motile	1/2	2/1+	Acid	1/2	2/1	Acid	2/3	4/3	.....	Yellowish	In 2 days	Positive	
	3	Human intestines.	Fleshier	Motile	1/2	2/1+	Acid	2/3	...	Acid	2/3	2/1+	Acid	.....	.....	.....	
	4	Liver of cow	Fleshier	Motile	7/12	2/1	Acid	7/12	2/1	Acid	5/6	6/5	Alk.	Yellowish	In 2–3 days	Positive	Cultures Nos. 4 and 9 were obtained, together with a streptococcus, from the liver of a case of parturient apoplexy.
	5	River-water	Spreading	Motile	1/2 * 1/3	2/1+ —	Acid	7/12 1/3	3/1+ —	Acid	7/12 1/3	3/2 —	Acid	Yellowish	In 1–2 days	Faint	
	6	Well-water	Spreading	Motile	1/2	3/1+	Acid	2/3	2/1+	Acid	7/12	3/2	Alk.	No distinct growth	In 2–3 days	Positive	
	7	Human feces.	Spreading	Motile	1/2	2/1+	Acid	1/2	2/1	Acid	2/3	4/3	.....	Yellowish	In 2 days	Positive	
	8	River-water	Spreading	Motile	1/2	2/1	Acid	1/2	2/1+	Acid	2/3	2/1+	Alk.	.....	.....	.....	* Where two sets of gas-reactions are given, the upper series refers to the temperature of 37° C., the lower to that of 20° to 25° C.
	9	Liver of cow	Spreading	Motile	1/2	9/5	Acid	7/12	5−/3	Acid	0	0	Alk.	Yellowish	In 2–3 days	Positive	
	10	River-water	Spreading	Motile	2/3	3/2	Acid	7/12	2/1	.....	0	0	Alk.	Yellowish	In 1–2 days	Positive	
	11	River-water	Fleshy	Motile	1/2	2+/1	Acid	1/2	2/1+	Acid	0	0	Alk.	Yellowish	In 2 days	Positive	
	12	River-water	Spreading	Motile	7/12	2/1+	Acid	1/2	2/1+	Acid	0	0	Alk.	No distinct growth	On boiling only	Positive	In a second test milk coagulates in four to five days.

Transitional.	13	River-water	Spreading	Motile	1/2	2/1	Acid	7/12	2/1—	Acid	0	0	Alk.	No distinct growth	In 2–3 days	Positive	Nos. 12 and 13 were isolated from the same sample. The surface-growth in gelatine stab-cultures of No. 12 became finely wrinkled and presented a ground-glass appearance, that of No. 13 remained smooth.
	14	Well-water	Spreading	Motile	7/12	2/1	Acid	3/4	2/1—	Acid	bub'le	—	Alk.	No distinct growth	In 2–3 days	Negative	
	15	Cattle	Spreading	Motile	1/2	2/1+	Acid	7/12	2/1+	Acid	0	0	Alk.	.....	.....	Positive	
	16	Well-water	Spreading	Motile	1/2	2/1	Acid	0/0	0/0	Acid	0	0	Alk.	Yellowish	In 8 days	Negative	
	16a	Hog-cholera	Small	Motile	1/2	2/1+	Acid	0	0	Alk.	0	0	Alk.	Yellowish	Not coagulated even after boiling	Negative	
Pseudo-colon bacilli.	17	Well-water	Spreading	Motile	0	0	Acid	1+/2 bub'le	2/1—/—	Acid	0	0	Alk.	Yellowish	In 5 days	Negative	Potato-growth better at 20° C.
	18	Well-water	Spreading	Motile	0	0	Acid	5/12	3/1—	Acid	0	0	Acid	No distinct growth	In 5 days	.....	
	19	Well-water	Spreading	Motile	0	0	Acid	1/2	2/1—	Acid	0	0	Alk.	No distinct growth	In 4 days	Negative	
Transitional forms.	20	Well-water	Fleshier	Motile	1* / 20 / 5/6	—/1/1	Acid	0/1/20	—/—/—	Acid	0	0	Alk.	Yellowish	In 5 days	Negative	Potato-culture made a year later shows whitish growth.
	21	Well-water	Spreading	Motile	1/6 / 5/6	4+/1/1	Acid / Alk.	1/2 / 5/6	2/1/1, 15	Acid / Alk.	0	0	Alk.	Grayish or yellowish	In 4–5 days	Negative	
	22	Well-water	Fleshier	Motile	1/2	2/1	Acid	1/4 bub'le	1/—	Alk.	0	0	Alk.	Yellowish	Not coagulated on boiling	Negative	
	23	Well water	Fleshier	Not motile	0 / 1	0	Acid	1/2	2/1	Acid	0	0	Acid	No distinct growth	In 2 days	.....	
	24	Well-water	Fleshier	Motile	5/1/4	—	Acid	1/5 / 1/6	—	Acid	1/5 / 1/6	—	Acid	.....	In 4–5 days	Positive	
	25	River-water	Fleshier	Motile	1/5 / 1/4	—	Acid	1/5 / 1/6	—	Acid	1/5 / 1/6	—	Acid	Straw color	Coagulated only on boiling	Negative	

* When two sets of gas-reactions are given, the upper series refers to the temperature of 37° C., the lower to that of 20° to 25° C.

	No.	Source.	Form of surface-colony on gelatine.	Motility	Gas-reaction in fermentation-tube containing one per cent. sugar-bouillon.									Potato.	Milk coagulated.	Indol-reaction.	Remarks.
					Dextrose.			Lactose.			Saccharose.						
					Total gas.	H / CO_2	Reaction	Total gas.	H / CO_2	Reaction	Total gas.	H / CO_2	Reaction				
Pseudo-typhoid bacilli.	26	Spring-water	Spreading	Motile	0	0	Acid	0	0	Acid	0	0	Acid	Yellowish	Coagulated only on boiling	Negative	
	27	Well-water	Spreading	Motile	0	0	Acid	0	0	Acid	0	0	Alk.	Yellowish	Coagulated only on boiling	Negative	Growth on potato only at 20° C.
	28	Well-water	Spreading	Motile	0	0	Acid	0	0	Alk.	0	0	Alk.	No distinct growth	No coagulation even on boiling	Negative	
	28a	Typhoid	Spreading	Motile	0	0	Acid	0	0	Alk.	0	0	Alk.	No distinct growth	No coogulation even on boiling	Negative	
Bacillus lactis aërogenes group.	29	River-water	Fleshy	Not motile	1/2	2/1	Acid	1/2	2/1+	Acid	0	0	Alk.	Yellowish	In 4 days	Positive	Nos. 29–33 inclusive show capsules in the hanging drop (unstained); probably gas-production in solutions containing starch.
	30	Spring-water	Fleshy	Not motile	1/3	3/1	Acid	11/12	3/2	Acid	2/3	2/1	Acid	Whitish, abundant	In 5 days	Negative	
	31	Well-water	Fleshy	Not motile	5/6	1/1—	Acid or alk.	5/6	5/4	Alk.	5/6	5/4	Alk.	Creamy (gas)	In 1 day	Negative	
	32	Well-water	Fleshy	Not motile	11/12	4/5	Acid	2/3	—	Acid	5/6	5/4	Acid	Creamy (gas)	In 1 day	Negative or very faint	
	33	Well-water	Fleshy	Not motile	1/1	1/1	Acid	3/4	3/2	Alk.	11/12	5/4	Acid	Grayish	In 2–3 days	Negative or very faint	
Bacillus cloacæ.	34	Well-water	Spreading	Motile	5/6	1/2	Alk.	6/12	5/2	Alk.	1/1	1/2+	Acid	Yellowish	In 6–7 days	Negative	Nos. 34–36 inclusive liquefy gelatine very slowly.
	35	Well-water	Spreading	Motile	11/12	1/2	Acid	5/12	2/1	Alk.	5/6	1/2	Acid	Yellowish	In 5–6 days	Negative	
	36	Well-water	Spreading	Motile	3/4	7/8	Alk.	3/4	7/8	Alk.	5/6	1—/1	Alk.	Yellowish	In 3 days	Negative	

The method followed by the writer in the general bacteriological examination of water consists, first, in the preparation of gelatine-plates for the usual enumeration; and, second, in the addition to every one of ten fermentation-tubes, containing a 1 per cent. dextrose-bouillon, a certain quantity of water. This is added most easily by first diluting the water, so that 1 or 2 c.cm. are equivalent to the quantity which it is desired to add to each tube. Pipettes graduated by drops are convenient, but not so accurate. In case of ground-water it is well to prepare in addition a flask containing 50 to 100 c.cm. of the water, and an equal, or greater, quantity of bouillon, to which sugar is *not* added. Plates may be prepared from this flask after sixteen to twenty-four hours.* When gas begins to appear in the fermentation-tubes, the amount accumulated at the end of each twenty-four hours should be marked with a glass pencil on the tube. From these tubes, which contain 50 to 60 per cent. of gas on the third day, and are very strongly acid, plates may be prepared to confirm the indications of *B. coli*. This, however, is not essential, for the writer has found as yet no species having these fermentative characters which is not one of the following: *B. coli*, *B. lactis aërogenes*, *B. enteriditis*, *B. typhi murium*, *B. choleræ suis*. The three last-mentioned species are probably as rare in water as *B. typhosus* itself.

My own experience coincides with that of Mathews when he states that 92 per cent. of all bacteria in ground-water are suppressed in the thermostat. While the addition of 0.5 c.cm., or even more, of such water may fail to produce cloudiness in any of the series of fermentation-tubes, the same quantity, or less, of surface-water never fails to infect the tubes. This difference impressed itself upon me very forcibly in the comparative examination of Potomac water and of some wells in Washington. On one occasion water purporting to come from a well caused clouding of all the fermentation-tubes. This, I knew, was a characteristic of Potomac water in midsummer, when gas-producers are rare. In tracing the matter I found that the person sent to collect the sample had found on the spot designated a public hydrant supplying Potomac water, and had thoughtlessly taken the water from this.

In recommending the use of fermentation-tubes for the detection and isolation of *B. coli* I do not wish to convey the impression that it is to supersede other methods, as, for instance, that of Wurtz. This method is not directly adapted to give us information concerning *B. coli*, nor is it capable of utilizing large quantities of water, excepting by the use of many plates. On the other hand, the method suggested here wholly ignores the search for typhoid bacilli, and focusses our attention upon the strictly fecal species.

* In the case of a certain spring in Washington 50 c.cm. failed to cloud bouillon in the thermostat.

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February 21, 1895.

THE RADICAL CURE OF HERNIA BY OPERATION.[1]

By John B. Roberts, M.D.,
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Recent experience has made me more willing than formerly to attempt the radical cure of hernia by operation. I was much impressed in 1890 by the conclusions of Bull,[2] who found relapse frequent. My custom, therefore, has usually been to refuse to operate upon reducible hernias in young children unless the tumor was large. In adults I

[1] Read before the Surgical Section of the College of Physicians of Philadelphia, December 14, 1894.

[2] Transactions of the American Surgical Association, 1890, p. 99.

declined to operate unless the tumor, if reducible, was large or the seat of attacks of colicky pain; irreducible hernias, whether large or small, were often deemed suitable for operative interference, because of the danger of strangulation when surgical aid might not be obtainable. In strangulated hernias operated upon recently I have, after relieving the strangulation, undertaken to perform a radical operation for closing the ring if the condition of the parts and of the patient warranted such operation. Formerly I was content to relieve the strangulation by herniotomy, if taxis had failed.

Ventral hernias at the site of former abdominal sections were usually operated upon, because of the difficulty of relieving them by apparatus and the comparative ease of successfully closing the ring by operation. My opinion was that inguinal and femoral hernias were likely to recur after operation, and that it was wise to wear a truss after the wound had healed. I believed that a permanent cure was usually obtainable by retentive apparatus in hernia occurring in children, and that operation in them was therefore very seldom demanded.

Experience has lately taught me, however, that though some of these conclusions were and are still in the main correct, the opinion as to the probability of return needs modification, as does the belief that a truss should be worn after operation. I now believe that many cases are permanently cured, and that a truss is usually not needed after a properly performed operation.

My records, except those of the cases at the Woman's Hospital, are very imperfect; but I believe that in the comparatively limited number of operations performed I have had no deaths, except in two instances of very large umbilical hernia, and in one or two strangulated hernias. In one case a large umbilical hernia had opened spontaneously and discharged several quarts of pinkish fluid on two occasions a few weeks prior to the operation. At the time of operation the patient's temperature was persistently high, and foul discharge was escaping from the sinus in the sac-wall and from ulcers on the surface of the tumor. Operation was demanded by the condition. Death occurred from septic peritonitis.

In a second umbilical case the patient had an enormous hernia and a very large dislocated spleen lying in the *right* iliac region. She died from interference to respiration, due to the increased bulk of the abdominal contents after replacement of the hernial contents.

Cure is more often permanent after well-performed radical operations than I formerly believed. Relapses will, of course, occur; but so will they after cures by the truss. Many cases are never cured by a truss, which then becomes a necessary part of the patient's life, and may become ineffective at a time when surgical aid is unobtainable. A relapse after an attempted radical cure seldom causes a hernia as troublesome

as the one operated upon unless it be allowed to go without proper mechanical support.

It is difficult to trace patients at a period long enough after operation to establish the question of cure, but some of my cases I have examined under such circumstances. As an example I quote the following somewhat unusual history:

Woman, aged sixty-five years. Very large labial epiplocele. Operation was performed in May, 1892. Silk suture applied to ring like shoelace. Post-operative insanity occurred. Violence of patient prevented proper care of dressings, and some suppuration occurred. A portion of suture was extruded as if edges of ring had sloughed from constriction. Patient examined two years and a half later. She states that a year subsequent to operation she had an abscess at seat of operation. She has worn a truss, weighs 200 pounds, and has a very pendulous abdomen. She has had no return of the hernia, and I found the canal well closed. I directed her to dispense with her truss.

A similar case in a male is this:

A patient, aged twenty-nine years, had large scrotal hernia on both sides. He had worn a double truss, but it had caused ulceration over both rings. Strangulation requiring etherization for taxis had occurred a few weeks before I operated. At the operation I isolated the sac, closed its neck and drew it upward through an opening in the aponeurosis of the external oblique muscle, twisted it and brought it down on the outside of the aponeurosis in the direction of the canal, according to the suggestion of Kocher. When examined about six months later the ring and canal were closed. I shall operate on the other side, as he finds it impracticable to wear a truss or is unwilling to do so. [This case had a return of hernia at upper part of scar when seen some weeks later than the reading of this paper.]

Results of the same kind are found in the following instances:

Woman, aged forty years. Irreducible femoral hernia. Operation May 25, 1892. Examined two years later. Has worn no truss. Ring closed and no return of hernia.

Woman, aged fifty years. Irreducible femoral epiplocele. Tumor painful and tender. Operation, April 7, 1893. A portion of fascia, dissected from pectineus muscle, was turned up and sutured to Poupart's ligament. Examined one year and eight months later. Has worn no truss. No return of hernia has occurred, though patient works hard and carries heavy articles without discomfort.

An illustration of a less satisfactory result, though the patient's condition is much better than before operation, is furnished by the following history:

Woman, aged thirty-two years. Operation, October 28, 1892, for irreducible femoral epiplocele. Examined two years and one month later. Slight evidence of bulging on coughing, but no tumor distinctly felt. Patient has worn truss since operation. Ordered to continue wearing truss.

I have operated for scrotal hernia in boys, the youngest being four months old, but have not been able to know the result after a long period of time had elapsed. As boys are so often cured by a truss when the hernia is of moderate size, I have little doubt that my operative cases remained cured, even though I have done the operation on large hernias only. One certainly was still cured after six and a half months.

Umbilical hernias in children are so uniformly curable by apparatus that operation must be seldom demanded. I would not hesitate, however, to operate shortly after birth if the protrusion was not easily retained by bandage or truss.

I have recently operated, to relieve pain, upon two cases of what seemed to be small, irreducible femoral hernias, to find a cystic tumor developed apparently in the sac of a cured hernia.

Woman, aged twenty-eight years. A pedunculated cyst had developed in the sac of an old femoral hernia. She had not worn a truss. The ring was closed by inflammatory adhesions so that it admitted only the end of a probe. Cyst and sac removed. Ring closed with silk sutures and reinforced by triangular piece of fascia from pectineus muscle. Before operation she had attacks of pain in tumor, requiring her to go to bed. Tenderness and pain on walking or sneezing existed when patient was admitted for treatment. Further history unknown.

Woman, aged nineteen years. Cyst had developed in the sac of an old hernia. Had never worn a truss. No omentum or bowel in tumor. Ring closed by neck of sac, which was adherent to itself. Edges of ring sutured with chromicised catgut. This case suffered pain before operation, and had several attacks of vomiting, with pain in the tumor during the five months of its existence. Examined six and a half weeks afterward. No return of tumor; no vomiting; pain gone, though she still has pain in other parts of body, such as abdomen and near breast of other side.

This condition is, I believe, not very rare; but I do not understand the cause of the pain, which in one case was certainly relieved by the operation. As it is stated that neither patient had worn a truss, the cause of obliteration of the neck of the sac is interesting. Spontaneous adhesion of the structures in the ring is, however, possible, for plastic exudate might readily be excited by a temporary strangulation followed by spontaneous reduction.

My previous conservatism has been further modified by the knowledge that a former patient with a small hernia, about four and a half inches above the navel, recently died of strangulation. When she was under my care several years ago for colicky pain in the tumor I might have operated, but advised her to be satisfied with a truss. She was a woman of culture, and I thought it perfectly safe to trust her with a truss.

My present attitude on the question of operations for the radical cure of hernia may be formulated somewhat thus:

Inguinal and femoral hernias in children, if reducible, should be

operated upon only when large or painful; if irreducible, they should always be subjected to operation unless there is some special contraindication.

Umbilical hernias in children seldom need operation.

Reducible inguinal and femoral hernias in adults should be operated upon if large or painful and when the patient's wilfulness, lack of intelligence, or poverty makes it probable that a well-fitting truss will not be properly worn.

Irreducible inguinal and femoral hernias in adults should always be treated by operation unless some special contraindication exists.

Umbilical hernias in adults, whether reducible or not, should usually be operated upon, and especially so in patients leading laborious lives and having voluminous abdomens difficult to fit with trusses.

Ventral hernias should usually be subjected to operation.

THE USE OF CHLORINE IN THE TREATMENT OF TYPHOID FEVER.[1]

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From the time of Hallé (1785) chlorine has been known as a disinfectant. Yet its use has been chiefly as an external application and for the destruction of infectious material unconnected with the human organism. It has been believed that because it is so extremely irritating to the respiratory mucous membrane it would be equally so to the alimentary —a belief not warranted by fact.

When it is administered *per os* it is, in part, changed into chlorides by combination with alkaline bases in the stomach or blood, and in this form is excreted by the kidneys. That it is not all so combined is proved by Edwards, who observed that in a fatal case of typhoid fever, in which the necropsy showed "enormous ulceration," these ulcers were dyed a greenish-brown color. If inhaled as chlorine and absorbed by the lungs, it permeates all organs and tissues, penetrating even to the brain. This was shown in the fatal case reported by Cameron, where the distinct odor of chlorine was perceived in the brain. Further evidence is to be found in the fact that when administered by the stomach, the nose being held, the odor of chlorine is noticed in the breath within a few minutes. Generally by twelve, almost invariably by twenty-four hours, the feces give a distinct odor of the gas. In Edwards's cases the feces were not offensive.

[1] Read before the Medical Society of the State of New York, at Albany, February 5, 1895.

Locally, chlorine is irritating. If given internally in moderate doses, it quickens the respiration, increases the force and frequency of the pulse, and excites the functions of the organs of secretion, notably increasing the flow of saliva and of bile. Huseman reports that it increases the appetite and facilitates digestion—certainly there seems to be a greater power of assimilating food. Kletzinsky believes that it stimulates the liver and kidneys. Bouchard is of the opinion that internally it is an excellent antiseptic. The reason for this statement is not far to seek. Its great affinity for hydrogen, generally setting free oxygen, permits of the oxygenation of putrefactive material. Thus, it corrects the fetor of certain products of fevers and prevents resorption of infectious material. Through its stimulant effect upon the liver more bile—itself a disinfectant of no mean value—is poured out. Because of its action upon the kidneys the toxins already formed are more rapidly eliminated. Since putrefactive processes in the intestine are inhibited, the temperature gradually falls and the ulcerations heal; the dangers from these ulcerations, as perforation, hemorrhage, and secondary infection, are minimized. As factors of less importance are its stimulating effect upon the heart and the increased digestive power.

As observed facts in its use in the treatment of typhoid fever, we may cite the gradual and permanent fall of temperature to the normal; the shorter duration of the disease, with rapid and complete convalescence; the clean tongue and improved digestion; the increased strength; clearer intellect; and absence of nervous disturbances.

For the past ten years Yeo has used a preparation of chlorine made as follows: In a twelve-ounce bottle are placed thirty grains of powdered potassium chloride and sixty minims of strong hydrochloric acid. To this water is gradually added until the bottle is filled, the greenish-yellow vapor of chlorine becoming at once apparent and marked. Finally twenty-four to thirty-six grains of quinine are dissolved in the solution and a small quantity of syrup of orange-peel is added. Of this preparation one ounce is administered every two, three, or four hours. In this preparation the effect of the quinine, as well as that of the chlorine, is obtained. In my own cases I have found the aqua chlori of the *United States Pharmacopœia* efficient, but it must be freshly prepared.

Chlorine-water should contain at least four-tenths of one per cent. of the gas, and, well diluted, can be administered in doses of from one to four fluidrachms every two, three, or four hours. As soon as the feces lose their offensive odor and the odor of chlorine is perceived in them, the dose-limit has been reached, and this amount continued will be sufficient.

It has been my practice to reserve chlorine for cases which have come under observation after ulceration has been established and systemic infection has become marked. In cases seen early, where the manifes-

tations are presumably local, the insoluble intestinal antiseptics, as naphthalin, salol, bismuth salicylate, beta-naphthol bismuth, and tribromophenol bismuth, are indicated. In the cases cited chlorine was employed after other methods, as cold bathing, calomel, hydrochloric acid, had failed. For the report of these cases I would acknowledge my indebtedness to Dr. F. E. Russell, House-Physician of the Fourth Medical Division of Bellevue Hospital.

CASE I.—F. A., aged twenty-two years; nativity, Norway; single; occupation, sailor; admitted November 23, 1894.

Family History. Father and mother living. One of six children, all living.

Previous History. Has had measles.

Present History. Patient began to complain on November 15th with diarrhœa and vomiting. Drank considerable water, and had considerable pain in abdomen. Head ached constantly. Patient stopped work as soon as he began to feel ill; diarrhœa and vomiting continued.

Physical Examination. Patient slightly anæmic. Fairly well nourished. Expression apathetic. Tongue moist, except down the middle; furred slightly; slightly coated white.

Lungs: On the right side behind, at the level of the angle of scapula, is an area about three inches in diameter where the breathing is bronchovesicular and the voice exaggerated. Percussion normal. Throughout both lungs, both before and behind, are a few subcrepitant râles.

Heart: Apex-beat is diffuse in the mammillary line in the fifth space. The first sound at the apex is feeble and slightly rough. Sounds at the base are normal.

Pulse: Pulse is rapid, very soft, compressible and regular.

Abdomen: Abdomen is not distended, but scattered over it and the lower part of the chest are many rose-spots, not elevated, which disappear on pressure.

Spleen: Spleen slightly enlarged, but cannot be palpated.

Liver: Liver apparently normal.

Further History. November 28th. On the 24th there were scattered over the chest, abdomen, and both axillary regions a large number of small rose-spots, not elevated, and disappearing on pressure. On the 26th most of these faded out, and to-day comparatively few remain.

The patient's mental condition since admission has been that of great apathy, and during the 24th and 25th there was stupor alternating at night with a muttering delirium. To-day and yesterday the patient can be roused, and will answer questions intelligently, but drops back to sleep, which, however, is restless, and the patient's expirations are groaning.

On the 24th the patient vomited three times, small quantities of curdled milk. Stools have been from two to three each day, thin, fluid, and smaller than at first. To-day his spleen is so much enlarged that it can be palpated. His tongue is clean and moist. The patient's pulse during the last two days has improved both in strength and rate. His general condition is somewhat better than on admission. His baths lower the temperature 3[illegible] Patient has not struggled in the bath, and the last few he has been anxious to get.

From the last note up to the second day of December the patient's

condition has improved steadily. The temperature is not so high nor the pulse so rapid as they have been before. Force of cardiac impulse is somewhat improved.

Beginning on December 2d for three days, the patient's general condition went back to where it had been originally. The temperature was higher, the pulse-rate rapid and more feeble; but on December 5th the general condition again improved, and since then the progress of the disease has been steadily better.

The bronchitis which was found on admission of the patient to the hospital was never very severe and cleared up entirely in two weeks.

On November 29th was first noticed upon his chest, thighs, and legs an eruption consisting for the most part of medium-sized papules, with a few vesicles and an occasional pustule. The skin between the pustules was white and clear. On December 1st the papules had mostly turned into pustules, a few of them being umbilicated. About December 3d, over the lower margin of the ribs and on the anterior surfaces of both tibiæ were several large furuncles. At present these still remain, but the pustules and papules have mostly disappeared. The patient's general condition is now very good. He sleeps well at night, is bright and rational in the daytime, and begins to complain of hunger.

December 14th. To-day the patient's order was changed to chlorine-water and whiskey. His temperature is not high (over 101°), but is constantly above normal. The stools are fluid and light yellow, but contain no undigested milk. The furuncles upon the body and legs have increased in number and size, and cause a great deal of discomfort to the patient. Upon the left scapula and both elbows are furuncles which are breaking down into open sores. The emaciation of the patient is extreme; the skin loose, wrinkled, scaly, and dry. The patient complains bitterly of hunger.

18th. There is a distinct odor of chlorine through the stools and breath. The temperature-range has been lower. The patient is brighter and looks better. The furuncles have taken on a healthier appearance and are granulating up. To-day, in addition to the chlorine and whiskey, the patient was given large doses of iron.

20th. For the last few days the patient's stools have been formed and much less frequent. They have the characteristic odor of chlorine. The furuncles look much better, and the patient begins to have some color in his cheeks.

27th. The general condition of the patient is much improved. He has a fairly good color, is gaining rapidly in strength and in flesh, and his appetite is much greater. He was allowed to sit up in bed.

January 5th. Since the last note the patient has been up and around the ward most of the time. He is still constipated, but the stools are normal. He has been getting a gradually increasing diet. Although he still runs a slight temperature, his condition is excellent, and all but two of the larger furuncles have healed up.

Summary of Treatment. From admission to December 10th he received baths, for several days as many as six in the twenty-four hours. In addition he received whiskey, calomel, hydrochloric acid, digitalis, and peptonized milk to December 13th. Although there was some improvement, the temperature never reached the normal, excepting on a few occasions after a bath, when it immediately rose again. After the

administration of chlorine, the fall was gradual and permanent, reaching the normal in three days and remaining about this point until the last record, which was January 2d. Coincidently with the fall of temperature the furuncles improved in condition, the general symptoms became better, and convalescence became established.

CASE II.—J. S., aged twenty-eight years; single; nativity, United States; occupation, horseshoer; admitted December 15, 1894.

Family History. Father and mother living. One of nine children; two died while very young. No tuberculosis in the family.

Previous History. Has had measles and pertussis.

Present History. Upon December 5th the patient began to vomit. This lasted about ten days; at the same time he was troubled with diarrhœa, a dull headache, pains in the back of neck, bones and muscles over the entire body; dry mouth and tongue, with flashes of cold and heat. The patient did not go to bed until December 15th, ten days later. Bowels are ordinarily regular. From December 1st to December 15th the patient has been on board a cattle-ship.

Physical Examination. Patient well nourished. Not anæmic. Tongue moist, thickly coated, yellowish-white.

Lungs: Show signs of mild general bronchitis.

Heart: First sound at the apex is very short; otherwise normal.

Abdomen: Not distended nor tender. There are a few, three or four, small rose spots on the abdomen, which disappear on pressure.

Spleen: Slightly enlarged; cannot be palpated.

Liver: Normal.

Urinary Analysis. December 17th. Color, amber; clear; reaction, alkaline; albumin about one-tenth per cent.; specific gravity, 1020.

Further History. December 16th. To-day can be seen over the entire abdomen, lower part of the chest, and to a slight extent upon the back, many rose-spots.

19*th*. A few spots still remain upon the abdomen. Spleen is the same size as on the 15th.

The tongue is clean, but dry, red, and glazed. Pulse is slow, of fair force, and dicrotic. Stools are three to five each day, small, thin, watery, yellow, and contain no masses. The patient's general condition is good.

28*th*. On the 20th of December all other medication and treatment was stopped, and the patient was put upon chlorine-water; from that time up to date the temperature-curve has gone steadily downward. To-day the patient shows that he has gained flesh and strength; he is brighter and feels better. The pulse has been less rapid and has lost its dicrotic character. The stools have diminished in number and are rarely diarrhœal; they smell strongly of chlorine. Yesterday and to-day the patient complained of severe colicky pains. The chlorine-water was omitted.

January 1*st*. The patient's temperature is now practically normal and he has no bad symptoms.

11*th*. The patient now sits up and walks a little; he is rapidly gaining in flesh and strength.

Summary of Treatment. Baths were administered from admission to December 20th without much effect either upon the disease or the patient's condition. He also received calomel and hydrochloric acid; the chlorine was first given on the 20th. The temperature first reached normal on the 25th and remained so until the date of the last record,

January 8th, although the chlorine was stopped on December 25th. From the administration of the chlorine the patient's condition began to improve.

CASE III.—W. S., aged thirty-eight years; married; nativity, United States; occupation, sailor; admitted June 24, 1894.

Family History. Negative.

Previous History. Up to the present time has never been sick. Says he is not a heavy drinker; is more of a periodical than a steady drinker.

Present History. Trouble began one week ago (June 17th). He had no chill, but felt all broken up, sore, and stiff. His diarrhœa began about June 20th; had two or three thin, yellowish movements in each twenty-four hours. Has not had any nose-bleed.

Physical Examination. Patient well nourished; somewhat anæmic; tongue moderately dry and coated white.

Lungs: In front percussion normal; high-pitched inspiration over both apices; otherwise normal. Behind normal, with the exception of a few subcrepitant râles over left base.

Heart: Normal in size and position; action regular; no murmurs.

Liver and Spleen: Apparently normal.

Brain and Nervous System. He had a marked tremor of hands and of tongue. During the daytime he was rational, but at night was delirious.

Further History. June 28th. On the abdomen and extending up onto the chest are many rose-spots, disappearing on pressure.

Urinary Analysis. June 30th. Color, amber; clear; reaction, acid; specific gravity, 1020; albumin present; few pus-cells.

July 1st. On the 29th of June the spots which had appeared the previous day had faded out and a new crop appeared. On the following day (the 30th) he had another crop. These spots have faded considerably, but can still be seen.

Last night the patient became delirious, and was given Magendie ♏v., hyoscyamine gr. $\frac{1}{100}$, hypodermically at 9 P.M.; during the remainder of the night was quiet, and to-day he has been perfectly rational. His general condition is very good. Yesterday noticed for the first time marked rigidity of right arm, accompanied by no pain nor tenderness.

9th. Since the last note the patient's temperature has run about the same. On July 2d began to give whiskey; has had no delirium since; pulse and general condition have remained very good.

11th. Yesterday and to-day the stools have been solid. Every morning the patient has had a chill, yesterday following a bath; but not this morning until eight hours after. Each chill has been followed by a fall of temperature.

In right lower chest behind there is an area about four inches in diameter where there is dulness on percussion, bronchial voice and breathing; crepitant and subcrepitant râles.

Urinary Analysis. Color, yellowish; turbid; reaction, acid; specific gravity, 1020; flocculent precipitate; pus-cells; granular cells.

13th. For the last two days the patient's general condition has been getting worse. Pulse has been much weaker; respirations shallower, and *subsultus tendinum* more marked. Yesterday afternoon the patient had a chill, followed by a rise of temperature from 100° to 106.8°; pulse became exceedingly weak; patient became very cyanotic and for several hours was in imminent danger of death. Last night the patient had a profuse cold perspiration, and the temperature has gradually

fallen to 97.8° this morning. Pulse is better than last night and the condition otherwise is about the same. Patient has no cough nor expectoration.

23*d*. Since the last note the patient's general condition has been improving very slowly; the temperature has been gradually rising and has been running irregularly between 99.2° and 101.8°. *Subsultus tendinum* is scarcely noticeable, and the patient says he feels very well. Last night he had a slight chill, followed by no rise in temperature. The signs in the chest remain the same as in note of July 11th.

26*th*. On the afternoon of the 24th the patient had a chill, followed by a rise of temperature of about two degrees. A 9 o'clock he had another chill, followed by a rise in temperature of two degrees and by a cold perspiration, but apparently no depression. At 9.30 yesterday morning the patient had still another chill, followed by a rise of nearly five degrees, by an excessive amount of cold perspiration and a good deal of depression In the morning his temperature had fallen to 99.6° and he slept well during the night. The râles in the chest have disappeared and other signs remain the same.

30*th*. Since the last note the patient's general condition has been about the same as before the series of chills. The temperature has run between 98.4° and 101.2°, reaching the highest point last night. To-day there is a little more tremor noticeable in hands and face, and for the past three days the bronchial breathing has disappeared from the chest, but the bronchial voice and dulness still remain.

August 3*d*. On July 31st the patient was given an egg, and was propped up in bed for a short time. Yesterday his temperature went up to 102.4°, but his general condition remained the same as before.

7*th*. Since the last note the patient has been running a high temperature of an irregular type for which no reason can be discovered. His general condition seems to be no worse for it. Signs in the lungs have returned almost to normal, slight dulness and slight change in voice alone remaining. The spleen is apparently normal in size. The patient's only complaint is of pain in the bones, arms, and back; the arms are not so rigid as they have been, and movement is not so painful. For the past two days the tendency of the temperature has been slightly downward.

Urinary Analysis. August 8th. Color, yellow; turbid; reaction, acid; specific gravity, 1013; albumin negative; few pus-cells.

Summary of Treatment. This patient received baths from the fifth day after admission until July 12th. In addition there were exhibited various drugs, opium, strychnine, hydrochloric acid, salol, sodium bromide, hyoscyamine, and capsicum. The reinfections of July 12th, 24th, and August 11th were treated partly by baths, with stimulation by whiskey and strychnine, and by quinine, salol, and salophen, and later by creosote in small doses. The temperature remained irregular, however, until chlorine was administered on September 13th, when it became normal, and remained so until the termination of this record, on October 16th.

CASE IV.—D. J., aged thirty-two years; single; occupation, bartender. Admitted October 24, 1894.

Family History. Father died of pneumonia; mother of Bright's disease; one of eight children, five of whom are living; no history of tuberculosis in family.

Previous History. Remembers no previous history.

Present History. Patient was first taken ill three weeks ago, about the 2d of October; he worked for a week, and was then compelled to go home and to bed. The sickness began with a heavy, dull, constant pain over the upper part of the abdomen and lower chest; it pained him to take a long breath. He coughed a good deal, which produced slight nausea, but no vomiting. Has had some chills since the beginning of the attack; bowels have been constipated. He has been a moderate drinker for a number of years.

Physical Examination. Fairly well nourished; quite anæmic; expression apathetic; tongue moist, slightly coated white; mouth somewhat dry.

Lungs: Right side in front, normal; behind, percussion normal; breathing exaggerated and expiration prolonged and somewhat high-pitched; voice exaggerated; from spine of scapula downward to the base signs are normal.

Left side in front normal; in axillary space below fifth rib are a few crepitant râles and friction-sounds. Behind over upper lobe, breathing and voice are exaggerated; over lower lobe, breathing and voice are diminished. Percussion normal. There are a few crepitant râles and friction sounds over both bases. When the patient coughs subcrepitant râles and sonorous breathing can be heard.

Heart: Normal in size and position. Pulse soft, but of good force; not rapid.

Spleen: Slightly enlarged.

Liver: Apparently normal.

Further History: October 27th. Since admission the patient's temperature has been constantly high; pulse and respiration never very rapid. On the 26th his tongue became thickly coated, yellowish-white, but continued moist. On the same day first noticed that the patient was somewhat deaf. During the morning he had a slight nose-bleed, Since admission the patient has been constipated, and to-day, after an ounce of castor oil, he had four movements which were all thin, yellow, and watery, containing small masses of yellow feces.

30th. On the 28th the patient's tongue was coated with a thick layer of brownish-yellow material, while down the median line it was dry and furred. Rose-spots first appeared over the abdomen on the afternoon of the 27th. On the 29th several new ones were noticed. To-day the patient's tongue remains the same, and he complains of its dryness. His deafness has increased considerably. The abdomen is tympanitic and somewhat distended. The stools have increased in number and are of the same character. The patient is more hapatetic and sleeps most of the time. He has occasional twitching movements about the mouth and in the arms and legs. His cough, which at first was frequent and loose, with scanty expectoration, has largely disappeared. His general condition is not so good as on admission.

Urinary Analysis. October 26th. Color, amber; cloudy; heavy brown precipitate; reaction alkaline; a trace of albumin; triple phosphates and ample urates; specific gravity, 1022.

On the 31st of October the patient was given phenacetin and salol, after which his temperature-curve, although constant, was on a lower plane than before. On the night of November 1st he had two movements containing some fecal matter and a considerable quantity of dark

clotted blood. On the second he had a hemorrhage from the bowels, about a pint of small dark clots. His temperature fell to 100.5° F. On the 3d he had two movements, which were fluid but dark and tarry, but contained no fresh blood. Since the 1st the patient's pulse has been softer and more rapid, and the heart-impulse is weaker; respiration has been most of the time about normal; when the patient is roused it increases in frequency. The patient is not so deaf as he has been, though he still hears imperfectly. He is drowsy no more, but is more apathetic. On the abdomen there are a few new spots, and the old ones have become papular. There is slight tympanites. In the lungs the signs of bronchitis have increased.

November 7th. Since the 3d the stools have been moderate in number, small, thin, and yellow, and show no evidence of blood. The patient's temperature has been slightly higher since the 3d, when the antipyretics were discontinued. On the 4th, for the first time, the tongue could be thoroughly cleansed; now it is not coated, but is red and glazed. The rest of his mouth is also very dry. Yesterday and to-day he has complained of pain over the right iliac region, extending up into the right chest. There are some tenderness on pressure and moderate distention. There are no new spots, but the old ones remain. The spleen is larger than when last noted. In the lungs there is an increase in the number of subcrepitant, mucous, and sonorous râles, but no signs of consolidation. The patient does not cough much and expectorates only a small amount of white mucus. The pulse is more rapid, quite soft, and compressible. He still has twitching movements of the muscles of the face, hands, and forearms, and occasional movements of the legs; at night he sleeps well and has no delirium. In the daytime he is very drowsy and more apathetic than he was. His general condition is not so good as at last note.

9th. On the 7th the patient had three fluid stools; the second contained a large number of small, dark-red clots. On the night of the 7th the patient was very weak, and although the temperature was high only at 9 o'clock, his heart-action continued rapid and weak and occasionally irregular during the whole of the night. He was restless and delirious most of the time, sleeping very little. His respiration was very irregular during part of the night, a few inspirations being strong and full, but most of them rapid, weak, and shallow. On the 8th the temperature was higher, 104.2° F., with a pulse of 140. He had seven stools, the third containing small, dark blood-clots and a considerable quantity of mucus. His general condition is very bad. He does not expectorate, and his respiration is rattling from the accumulation of mucus in his throat and bronchi. He sleeps little, complains of pain in the right side of the abdomen and chest, and of his difficulty in breathing. Early in the morning his temperature dropped to 100.4° F., and has remained down most of the time since. Heart-action has improved and respiration is not so rapid; the general condition has improved slightly during the last twenty-four hours.

Summary of Treatment. This patient received various remedies: hypophosphites, quinine, hydrochloric acid, whiskey, phenacetin, salol, opium, strychnine, and strophantus. Baths were commenced on October 30th and continued to November 8th. The temperature was very irregular, frequently going below, but never remaining at normal. Chlorine was administered on November 26th and continued until

December 15th. The usual results appeared as to the patient's temperature and general condition. On the 16th, after being out on a pass, the temperature rose temporarily. He was discharged cured on the 22d.

The cases above cited are average ones, and illustrate very well the effect of the administration of chlorine.

CONCLUSIONS. In the treatment of typhoid fever:

1. Chlorine can be safely administered until complete disinfection of the alimentary canal is obtained.
2. Under its use the tongue becomes cleaner, the appetite and digestion better, fever lower, and the stools devoid of odor.
3. The general strength, the intellectual processes, and nervous conditions improve.
4. The disease is shortened in duration, and usually proceeds to rapid and complete recovery.

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MODIFIED MILK AND STERILE MILK.

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I. MODIFIED MILK. THE CASEIN OF COW'S AND WOMAN'S MILK.

MANY years ago, after examining the numerous proposed substitutes for woman's milk, the author found as his final result that no other substance appeared to be equal in value, as a basis for the rational feeding of infants, to cow's milk. Furthermore, that he regarded the transformation of cow's milk by means of a suitable change in the percentage and properties of its constituents had been practically accomplished, so that in what he thought might be fairly entitled "humanized" milk we possessed a chemical and physiological equivalent of human milk.

The modification of the percentage-composition was regarded merely as half of the necessary change, the other and equally important part being the alteration in the character and deportment of the constituents themselves. Since that time there have been many additions to our knowledge of the true nature of these constituents, and these additions have tended to increase the relative importance of the latter half of the modifying process. More and more definitely has it been established that cow-casein and woman-casein differ not only in their chemical composition and formulæ, but also in the manner in which they are combined with the mineral substances existing in the two fluids. And not only so, but the differences in the manner in which they react with

chemical reagents and their different behavior with solvents and digestive fluids, and, most important of all, the differences in the mode and degree of their assimilation in the various portions of the digestive tract have been pointed out and insisted upon.[1]

Some of these differences are encountered in a striking manner as soon as the attempt is made to determine the casein in woman's milk in the same way as has been found to be the most accurate for the determination of the casein of cow's milk. This is, to take 5 c.cm. of the milk, dilute to 50 c.cm. by the addition of cold water, and then add from 0.5 to 1 c.cm. of a 10 per cent. solution of acetic acid. Cow's milk forthwlth curdles, and in less time usually than five minutes a dense precipitate of tough curds settles out completely. But the same method applied to woman's milk fails entirely. Only a small amount of a soft flocculent substance separates, the liquid remains white and turbid, and finally the filter is found to retain merely a thin coating, representing but a small fraction of the casein. And this quantitative method suggests the proper method of comparing the deportment of cow's and woman's milk on the addition of acid. The customary way is to take a small quantity of each milk in a test-tube, add a drop or so of acid, and then agitate the mixture. This method is too crude, since the character of the curd thus produced differs with the nature, strength, and amount of acid, and with the gentleness and rapidity of the agitation. So crude indeed is the method that it has led to the statement that the coarseness and solidity of the curd of cow's milk depend merely on the fact that this milk contains a larger percentage of casein. It has been stated that simply by dilution with water until the percentage of casein is the same, the appearance of the curd will also be the same in the two milks. The statement is incorrect, the soft cloudy turbidity in one case being readily differentiated from the coherent particles in the other.

The most satisfactory and convincing way of making the comparison is as follows: Take a number of watch-glasses of equal size and pour into each 5 c.cm. of a cold 1 per cent. solution of acetic acid. Then let the various dilutions of cow's milk and woman's milk fall drop by drop from as many separate burettes or dropping-tubes, through a height of three inches, into the middle of the acid below.

It has also been stated that when the casein of cow's milk is thrown down by dilute acid it carries with it 1.16 parts by weight of fat to each part by weight of casein, whilst that precipitated from woman's milk

[1] "The Chemistry and Clinical Value of Sterilized Milk." Leeds and Davis: Amer. Journ. Med. Sci., 1891. "Proteids of Milk." Haliburton: Journal of Physiology, xi. p. 449. "Die Milch-untersuchungen." Lehman: Pfluger's Archiv, 56, p. 558. "Beitrage zur Kenntniss des Frauencaseins." Wroblewski, 1894. "Die chemischen Unterschiede zwischen Frauenmlich, etc. Soxhlet: Munch. med. Woch., 1893.

carries down three parts of fat. I have been unable to repeat this experiment with woman's milk, because, as stated above, I have been unable to precipitate its casein with dilute acid. But with regard to that part of the statement which refers to cow's milk the question naturally arises: If it be true, then in the analysis of milk it is entirely unnecessary to make separate determinations of the casein and the fat. For, if the fat be known, then by dividing its percentage by 1.16 we should have at once the percentage of casein; or if the percentage of casein be already determined, by multiplying by 1.16 we should obtain the fat. As a matter of fact, the fat and casein do not stand in this or any other fixed ratio in milk, and as a consequence they are always separately and independently determined in every complete analysis.

In order to ascertain how widely the ratio may vary, I precipitated the casein and fat in a certain sample of whole milk (A); in cream (B); in a mixture of 75 c.cm. of A and 25 c.cm. of B (C); and in a mixture of 50 c.cm. of A and 50 c.cm. of B (D). The precipitation was made with dilute acetic acid. The casein was determined by finding its nitrogen and multiplying by the factor 6.25. By subtracting the casein from the total weight of the precipitate, the fat dragged down by the casein was ascertained. This figure for fat was compared with the total fat as found in a separate portion, and in every case was a little less; in other words, nearly all, but not quite all, the fat went down with the casein. For example, the total fat in the whole milk (A) was 3.4 per cent., while that part of this total fat which was carried down by the casein, when this was precipitated in sample A, was 3.27 per cent. The results were:

	Casein.	Fat.
A. Milk	2.38 per cent.	3.27 per cent.
B. Cream	2.04 "	19.93 "
C. ¾ A and ¼ B	2.38 "	7.33 "
D. ½ A and ½ B	2.25 "	11.73 "

The ratio of casein to fat in these four mixtures was:

	Casein.		Fat.
A.	1 part	to	1.38 parts.
B.	1 "	"	9.8 "
C.	1 "	"	3 "
D.	1 "	"	5.2 "

instead of the assumed ratio of 1 to 1.16.

The average casein in cow's milk is 3 per cent.; the fat is 3.75 per cent. The average casein in woman's milk is 1.35 per cent.; the fat is 4.13 per cent. This makes the ratio for the former 1 to 1.22, and for the latter 1 to 3. So if it were true, which it is not, that dilute acid precipitated the casein and fat in woman's milk just as perfectly as it does in cow's milk, then the coagulum in the former would contain

nearly three times more fat. Granting, however, that the coagulation of both milks takes place in the same manner in the stomach, the effect of the larger amount of fat would be to distend proportionately the coagulum of the woman's milk and keep the particles asunder. Therefore, it has been argued, fat should be added to cow's milk in such quantity that the milk, when modified for infant nutrition, should contain the casein and fat in the ratio of 1.22 to 3. The addition of the fat to make the above ratio is justified by adequate chemical, physiological, and clinical data, and such is now the general practice. At the same time, I have seen no evidence from actual experiment in the laboratory that the presence of this excess of fat, or even of a much larger excess, made any change in the inherent nature of the particles composing the clots themselves. On allowing mixtures C, D, and B to fall drop by drop into dilute acid, as above described, the phenomena are often very striking. A film of fat shoots over the surface and arranges itself in a network of diverging lines; but the great mass of the drop plunges directly to the bottom, and then rolling outwardly in coherent clots keeps sharply separate from the acid liquid. Of course, a curd containing three or five or ten times more fat than casein, like that from the above mixtures, is more rounded and less dense than the curd from whole milk containing only 1.38 times more fat; but it always is coherent and curd-like, and, unlike that from woman's milk, it does not diffuse off into the surrounding liquid in intangible cloud like turbidity. And while the myriads of microscopic globules of which butter-fat is composed are more perfectly entangled by the casein and serve better to keep apart the particles of the clot than any other substance with which I am acquainted, yet so far as this action of distention is concerned it is a mechanical one. It is that of an attenuant, causing the particles of casein to present a greater surface to the solvent action of the digestive fluids. It does not differ, so far as its effect in distending and subdividing the clot is concerned, from gum, sugar, dextrin, starch-water, gelatine, extract of barley, extract of oatmeal, etc. These are substances which are not themselves precipitable by acid, but when they are added to milk they are mechanically carried down in the clot of casein. In a former article (*Trans. Coll. Phys.*, Philadelphia, vol. vi.) I have given the results obtained with solutions of these bodies when added to milk, and have shown that they are with difficulty removed from the clot even by long-continued washing. But while their action in attenuating the clot is beneficial, it must not be forgotten that all these bodies are foreign and abnormal to natural infant-food. Nature herself presents three attenuants of the clot: the globules of butter-fat, which are by far the most important, lactalbumin, and lactose. Admitting the importance of the first in the making up of modified milk to be conceded, what should be done in reference to the

lactalbumin. This can be best decided by comparison of the percentage-composition of human milk, cow's milk, and cow's milk diluted until it approaches to percentage-equality with human milk. Omitting the lactose and mineral constituents as not being involved in the present inquiry, the percentages are :

	Fat.	Total albuminoids.	Casein.	Albumin.
Human	4.13	2.00	1.35	0.55
Cow's	3.75	3.76	3.00	0.76
Cow's, ½ dilute . . .	1.87	1.88	1.50	0.38

To make up the deficiency in lactalbumin it has been suggested by several writers, among others by Prof. Lehman, to add egg-albumin. In practice, however, the results are very disappointing. The white of egg must be freshly prepared and its membranes must be strained off, or otherwise they will be mechanically carried down in the clot. Simple as the proposition appears, it is a troublesome and messy operation to prepare egg-albumin and add it to diluted milk in the approximate proportion of 0.4 to 0.5 per cent. But this objection is less serious than that of its inability to act as efficaciously as butter-fat in attenuating the clot. To study what actually occurred, I exaggerated the amount of egg-albumin in three experiments with as many separate samples of milk. Each sample was diluted with an equal volume of water, one-half of each sample was mixed with 20 per cent. of egg-albumin, and dilute acid added to the six. Albumins A and B were thoroughly strained, C was not. The results were :

	Casein.	Casein and albumin.
Milk	1.15 per cent.	1.00 per cent.
Milk and albumin (A) . . .	.....	1.06 "
Milk	1.6 per cent.	
Milk and albumin (B) . . .	.....	1.3 "
Milk	1.6 per cent.	
Milk and albumin (C) . . .	.....	1.8 "

Egg-albumin, like lactalbumin, is not precipitable by dilute acid. There was no difference perceptible to the eye between the clots in the milks alone and in the milks to which the white of egg had been added, except in the case of C. Though it was mechanically carried down in the casein, it was mostly removed from the clots in the process of washing, as the lower figures with A and B show. Of course, in the process of digestion the clot is not subjected to such a washing and the albumin exerts a beneficial action in distending and attenuating the clot. Vastly less so, however, than the globules of butter-fat, which are not only almost perfectly co-precipitated, but cannot be removed from the casein by the most exhaustive washing.

In attenuating the clot, instead of using any foreign substance, it would be most natural to use such substances as are already represented in woman's milk. These substances are lactose, globules of butter-fat,

and soluble proteids, non-coagulable by acid. In addition to their mechanical action as attenuants, they have the more important function of acting as the elements of nutrition essential to be added to the diluted and modified cow's milk. The lactose obtained from cow's milk by processes of crystallization and refining is of great purity and is identical in its properties with the lactose of woman's milk. The butter-fats of cow's milk, cream, and woman's milk are so nearly the same in average composition that their differences are not practically appreciable. They differ from one another far less than they do from the animal and vegetable fats which most nearly resemble them. When cow's milk of average composition is diluted with half its volume of water, and one-eighth of this new volume is added of cream of average composition, the ratios are as follows:

	Fat.	Casein.	Albumin.
Cow's milk	3.75	3 00	0.75
Cream	18.80	2.00	0 50
Modified milk	4.13	1.74	0.44
Human milk	4.12	1.35	0.65

These figures for cow's milk are in accordance with my own analyses of a large number of samples of whole dairy milk supplied to New York City. If instead of them we take for the average the figures compiled by the Vermont Agricultural Station for all parts of the United States, and published in their report for the year 1891, we have for milk: Fat, 4.00; casein, 2.60; albumin, 0.70; and for modified milk: fat, 4.26; casein, 1.54; and albumin, 0.43. But in both cases the insoluble proteid is about as much too high in amount as the soluble proteid is too low. The addition of albumin alone does not take away the excess of casein, and as yet I have not encountered any practicable way of overcoming this inherent difficulty except by properly diminishing the insoluble proteid, nor any process so well adapted for so doing as that of an incipient and very partial peptonization of the casein. And inasmuch as breast-milk is sterile, while the freshest dairy milk is not, and the process of partial peptonization also renders the latter practically sterile, the main difficulty in the easy preparation of a modified cow's milk which shall be a chemical and physiological equivalent of woman's milk—*i. e.*, a "humanized milk"—is capable of being overcome, and the rest of the problem is a matter of nice adjustment and the incorporation of the remaining constituents.

II. STERILE MILK.

Much confusion has arisen in reference to this subject on account of the different meanings in which the terms "sterile" and "sterilized" milk are used. The confusion has partly grown out of the history of the subject and partly out of the difference of the processes to which milk is

subjected in order to render it sterile. Prior to the classic researches of Hueppe (1859), Pasteur (1860), and Lister (1873), the true causes of the souring, fermentation, and putrefaction of milk were unknown. They established the fact that these changes would not take place in case the milk was kept for some time above the temperature of boiling water. When milk was to be sterilized for use in a bacteriological laboratory it was prepared in this manner, and when it was first introduced into general use on a commercial scale the same process was followed. One of the most perfect machines for so doing is that of Neuhaus, Grönwald, and Œhlman. The author studied this machine as used for supplying sterilized milk in Mayence, Germany, in the summer of 1891, and incorporated his report in the Report of the New Jersey State Dairy Commissioner for that year. The milk was subjected to two preliminary sterilizations at 80° to 90°, with a period of cooling between them. These heatings were about one-half hour long. Finally the temperature was raised during half an hour to 102°. I brought some of this milk to this country, and, although the cream and casein separated from the serum and the contents of the bottle were of a brownish color, they kept for many months, and on opening were found to be sterile. The whole object of the complicated mechanical appliances in this and similar apparatus is to heat the milk for an interval to 102°, in order to make sure of destroying, not only the bacteria, but also all spores which might possibly be present. If the term sterilized milk is used in its original and rigid signification, it should be restricted to that which has been heated above 102°. But the term is not now so restricted. Milk which has been submitted twice to a heat of 100° during two intervals, with a period of cooling between them, is ordinarily used in the laboratory for all purposes for which sterile milk is required, since the spores that need a higher temperature than 100° to kill them are seldom present. Moreover, milk which has been Pasteurized—*i. e.*, heated for an interval to temperatures considerably below the boiling-point—is sterilized in regard to the pathogenic bacteria that are liable to occur in milk, and frequently in regard to all bacteria. This is so well recognized that the apparatus sold for the household sterilization of milk maintains the milk in an atmosphere of free steam at a temperature a little below 100°. And starting with the preconceived notion that the heat must be raised to 100°, the author in his own experiments, amply confirmed by those of many other observers, found to his great surprise that a temperature of 70° continued for half an hour usually destroyed all the bacteria, and in many experiments he obtained the same result in a still briefer interval. In fact, the whole tendency of the labors of those who are engaged in improving the quality of the milk supplied by dairies for the feeding of infants, is against resorting to the sterilization at 100° as a safeguard which should be needed by any milk suitable for this purpose. The best

dairy-milk at present obtainable in New York, and on which every precaution has been expended, contains by the time it is delivered from 3000 to 15,000 bacteria per cubic centimetre. At the dairy I found that this milk while in the can used for the milking contained in one trial 260 bacteria per cubic centimetre. The same milk passed over an aërator, by which its temperature was reduced to 50° F., but by which it was exposed to air over an extended surface, had the number of bacteria raised to 380. By heating another portion taken directly from the milk-pail to 70° C., and keeping it at this temperature for ten minutes, it was rendered sterile. The great economy involved in heating the perfectly fresh milk from the temperature of blood-heat to 70°, or through only 32°, is of the highest practical importance, and I am at present engaged upon apparatus intended to effect this result in the dairy. Certainly fresh milk obtained from a dairy and from cattle, both under proper hygienic conditions, and then brought to a practically sterile condition, is vastly to be preferred to milk as ordinarily sterilized. The latter is market-milk in which frequently many tens of thousands of bacteria per cubic centimetre have already developed, along with the products of decomposition under their action, before being cooked for a considerable time at or near 100°.

In this connection my attention has been drawn to an article upon "The Nutrition of Infants Fed upon Raw, Boiled, Pasteurized, and Sterilized Milk," by Dr. Henry Koplik (*New York Medical Journal*, 1895, p. 455). It is a plea in favor of using milk only after it has been sterilized by prolonged heating at 100°. The experimental evidence brought forward in its favor is that afforded by the determination of the relative percentages of nitrogen contained in the feces of infants fed upon the different kinds of milk. This again is founded upon the thesis, which the writer first endeavors to establish, "that in the nitrogen taken up by the system we have a clear and definite index as to the assimilation of albuminoids ingested into the economy."

But the figures obtained show the least loss of nitrogen in the feces of an infant fed upon raw milk, and the greatest loss when the milk was sterilized. In fact, the writer rejects his own experimental evidence as not tending to support the thesis put forth, and concludes that: "Given a cow's milk to start with, the nitrogen excreted seems to be much the same, whether we Pasteurize, boil, or sterilize the milk." The unfavorable results which Davis and many other careful observers have noted in the clinical history of infants fed on sterilized milk, he regards as more fairly attributable to the fact that cow's milk contains casein which differs widely from the casein of breast milk. With the latter part of the statement I am in entire accord, believing that the most important forward step in the nutrition of infants has been that of modifying the inherent nature and the state of combination of the cow casein.

REVIEWS.

TWENTIETH CENTURY PRACTICE. AN INTERNATIONAL ENCYCLOPEDIA OF MODERN MEDICAL SCIENCE. By LEADING AUTHORITIES OF EUROPE AND AMERICA. Edited by THOMAS L. STEDMAN, M.D., New York City. In twenty volumes. Vols. I. and II. New York: Wm. Wood & Co., 1895.

THE first two volumes of this work, the most extensive in size of any hitherto originating in this country, are now before us. Volume I. is devoted to "Diseases of the Uropoietic System." Volume II. has the subtitle "Nutritive Disorders." The editor explains in a preface that the subject of infectious diseases is reserved "for the later volumes, in the hope that by the time they are published a solution of some of the problems in the pathogenesis and therapy of these affections will have been reached." The inference might be drawn that in the pathology and therapy of other diseases, especially those of the kidney, Addison's disease, rheumatism, and diabetes mellitus, finality has been reached. We know no imperative reason for considering infectious diseases before those of organs or of metabolism, and the reason given in this case for doing otherwise is both needless and absurd. As in all similar works, the articles in these volumes vary widely in quality. Some of them are valuable additions to our literature, while of others nothing good can be said. In the very beginning we are struck by peculiarities of classification and assignment of topics and space, and these have results so serious that they must prevent the work, if present in future volumes, from taking the high position its size would seem to promise. Other peculiarities are foreshadowed in the affectation of the title and the inaccurate titles of the separate volumes.

We are willing to let the *Twentieth Century* pass its own opinion on the former, but it is a matter of some interest to notice in these volumes many of the symptoms of the "end-of-the-century-disease" as described by Nordau, such as vagueness and repetition. As regards the division of space, what can we think of giving one hundred and forty pages to rheumatism, or one hundred and eighty to gout, and but one hundred and ten to diseases of the kidneys, or, including surgical diseases and many symptoms of diseases of the urinary organs, two hundred and thirty pages? Even when the same disease is treated by two writers the subject is by no means always exhausted, though repetition is common. Some of the articles have more the style of an occasional article than an encyclopædic work. In the latter, personal experience and individual views are certainly in place, but one expects also at least an outline of current knowledge and of prevailing views on important questions. A work of this size is, or should be, consulted not only by those looking for prescriptions for actual patients or their symptoms, but also by those unable to refer to the recent literature of a subject, yet desirous of in-

forming themselves on it as easily and as accurately as possible. It is, or should be, also, a source to which later writers may be able to turn to find out quickly what was thought or done about various diseases in times past. Thus, Virchow's *Handbuch* gives us an index of the theory and practice of forty years ago, as Ziemssen's that of twenty years ago. We doubt if these volumes can be used in the same way. If it be said, in extenuation, that the present work includes more topics than either of those mentioned, we have only to point to the magnificent encyclopædia of Eulenburg.

A work on medicine in twenty volumes should not fear comparison with others of similar size. A thing which seriously lessens the value of the present work now, and which will affect it later, is the lack of references. Some of the articles, even some of the longer ones, have no references, except perhaps to the sources of cases cited. Some others have a few, but not always the most important ones. In some articles it seems fair to find a relation between vagueness of exposition and lack of reference. The article of Von Noorden, however, in Volume II. is a brilliant exception to this criticism, and should serve as a model for others. The indexes are very unsatisfactory. There is a matter we cannot resist bringing up at this time, namely, the manner in which books of this kind are sold in this country. The putting forth, year after year, of the same edition of a large work is a wrong no less to the authors than to the readers of the volumes. The plan followed in Germany and France, of selling single volumes, and of revising those most called for or most subject to change, is so much better in every way that it is strange the other plan is still followed by us.

The time estimated for the completion of the work is unduly long, notwithstanding the numerous mechanical difficulties in the way. The faults indicated, however, do not prevent the present volumes from being of great value, so great that no physician should fail to read them, and, if possible, possess them. There are single articles in each one of value far beyond the price of the volume. The mere mechanical part of the work has been well done; the proof-reading is good as regards typography, not so good as to grammar and syntax. Other errors which careful editing would have corrected are not infrequent, such as the statement in regard to the measurements of the daily amount of urine according to different systems, on page 20, Vol. I. The translations of French and German articles are fairly good. The translator's note on page 647, Vol. II., is inane. It is impossible to review all the articles in these volumes in full, and we shall confine ourselves to giving an outline of the contents, with comments on some of the more striking features.

Volume I. begins with a chapter on Medical Diseases of the Kidneys, by Francis Delafield. In it the author has elaborated his classification of renal diseases more thoroughly and more successfully than in previous articles. This classification has many advantages, but its real value can only be tested by clinical experience. The matter of treatment receives more space than in the author's former articles. The main fault with the chapter is, as we have already said, that it is too short, and the sketchy way in which albuminuria, dropsy, and uræmia are described is a serious defect in an article admirable in many ways. Surgical Diseases of the Kidneys, Diseases of the Ureters, and Diseases of the Bladder are considered in two able chapters by Reginald Har-

rison. Following this is an excellent chapter on Diseases of the Prostate, by G. Frank Lydston. The author has the courage to record his want of experience with castration for enlarged prostate, yet the objections he urges do not touch the most important points involved. No matter how this question is finally settled, a discussion of the experimental and clinical evidence already available might have been expected in this work. Dr. Lydston also writes on Diseases of the Male Urethra. He holds gonorrhœa to be a "filth disease," which may arise *de novo* in the female. He "unhesitatingly affirms that, other things being equal gonorrhœa is more likely to be contracted innocently than syphilis." Here, as also in connection with other matters relating to the gonococcus, (spoken of as a bacillus!) and gonococcal infection, a discussion of observed facts would have been welcome. As regards gonorrhœal rheumatism, the author "inclines to the belief that the joint-disease is due to toxins elaborated in the urethral infection, absorbed into the circulation, and conveyed to the joint-surfaces." Not a word about actual observations! Notwithstanding faults of this kind, the article contains much of value, and will repay careful perusal. The remarks on treatment can be read with advantage by young physicians who have been properly taught the known facts about the pathology of the disease, but are unfamiliar with its therapeutic requirements. The next chapter, by E. Hurry Fenwick, has the curious title Diseases of the Urine. In this certain conditions are considered from the standpoint of symptoms—*e. g.*, hæmaturia, described largely from the author's own surgical experience; pyuria, accidental albuminuria, cystinuria, phosphaturia, oxaluria, polyuria, and chyluria. Although this chapter contains much of value and interest, it is disappointing on account of its mode of presentation. Nowhere in the book can we find any reference to albumose, peptonuria, or nucleo-albumin, and yet these are surely proper subjects for such a work. Volume I. ends with a chapter by Howard A. Kelly, on Diseases of the Female Bladder and Urethra, a subject which Dr. Kelly has done so much to advance, and presented in his clear and forcible manner. This chapter should have been longer.

Volume II. begins with Addison's Disease and other Diseases of the Suprarenal Bodies, by Sir Dyce Duckworth. The author does not make clear that Addison's disease is a disorder of nutrition, and, what is more important, he has not availed himself of the large amount of clinical, anatomical, and experimental work bearing on the subject which has been put forth in the last fifteen or twenty years. The statement (p. 16), "an excess of indican (urohæmatoporphyrin) has been rather frequently noted, etc.," gives an idea of the author's point of view. In marked contrast with this is the excellent article by Carl von Noorden on Diabetes Mellitus, in which all the aspects of this disease are admirably discussed and its treatment described in unusual detail. The next article, on Rheumatism, by Thomas J. Maclagan, is interesting on account of the large amount of speculation and small amount of observation it contains. Thus, after nearly thirty pages about theories of rheumatism, the conclusion is reached that the "rheumatic poison is malarial." Descriptions of Laveran's organism are dragged in by the heels in order to demonstrate the author's want of personal knowledge on the subject. As an example of Dr. Maclagan's mental processes, and of the chance way remedies of value may be discovered, the following is worth quoting (p. 246): "A striking fact in the natural

history of the malarial fevers is that the trees which provide their cure grow best in countries and localities in which these fevers most prevail, nature seeming to produce the remedy under climatic conditions similar to those which produce the disease. In rheumatism a low-lying, damp locality and temperate climate present the conditions most favorable to its occurrence. Looking about for a plant or tree which flourishes under such conditions, that which most naturally presented itself was the willow—the various species of salix. Among the salicaceæ, therefore, a remedy for rheumatism was sought. The results exceeded all expectations." Certainly nothing could be simpler than this. We need no longer try to get new remedies out of coal-tar, nor to elaborate antitoxins. The author seems to intimate that salicin was recommended for rheumatism earlier than salicylic acid. He says, "Early in 1876 the results were given to the profession." Later: "Early in 1876 Stricker and Riess published a most favorable account of their experience (with salicylic acid). Their results were quite in accordance with those got from salicin." As a matter of fact, Stricker's article appeared in the first number of the *Berliner klinische Wochenschrift* for 1876. Henry M. Lyman contributes the next chapter, a long and interesting one, on Gout, and A. E. Garrod the next one, on Arthritis Deformans. Following this is a chapter on Diseases of the Muscles, by the late Dujardin-Beaumetz. How that well-known writer of therapeutic *causerie* got "*dans cette galère*" is difficult to understand. The chapter is altogether unsatisfactory. The volume closes with a chapter on Obesity, by Oertel, in which the methods of treatment devised by him are fully described.

It must not be supposed from the examples cited that we find nothing good in these volumes. On the contrary, they contain much of value, which we do not doubt will be appreciated by the profession. G. D.

CHIRURGIE DE L'URETHRE, DE LA VESSIE DE LA PROSTATE. INDICATIONS MANUEL OPERATOIRE. By V. ROCHET, Professeur Agregé à la Faculté de Lyon. Paris: G. Steinheil, 1895.

OPERATIVE SURGERY OF THE URETHRA, BLADDER, AND PROSTATE. By V. ROCHET.

THIS work is much like the last book of Hurry Fenwick's in that it purports to represent the latest advances in the surgery of the urethra, bladder, and prostate, with particular reference to operative technique and detailed descriptions of mechanical treatment when this is required. Rochet states with the characteristic theoretical modesty of his nation that his work is not intended for expert surgeons, since the latter will find nothing in its pages with which they are not already familiar, but is rather designed to help students and general practitioners. The author has very wisely refrained from quoting largely, but has endeavored to use his right of selection and has given as briefly and clearly as possible a description of methods of choice. The book is so illustrated that it is easy to understand operations the description of which might otherwise be misleading. A few pages are devoted to what are called Anatomical and Physiological Considerations. These, though excellent, might have been omitted. There follows a section upon vices of confor-

mation. This is simply an epitome of what is to be found in every well-known text-book. The same may be said of Section II. upon traumatic inflammatory lesions. In the latter section there are one or two excellent illustrations and descriptions of the method of closing urethral fistulæ, and it is worthy of note that Zienbekis's method of radical cure in urethro-rectal fistulæ is clearly presented.

The treatment of strictures—*i. e.*, internal and external urethrotomy and urethrectomy—receive due consideration. Urethrostomy is also described with its proper indications; *i. e.*, certain traumatic and inflammatory strictures amenable to no other form of treatment and strictures complicated by well-marked lesions of the upper urinary tract and systemic involvement. Urethral and periurethral suture are carefully described.

The second portion of the book is devoted to the bladder, considerable space being devoted to the treatment of exstrophy. In this relation the author describes at length the implantation of the ureter in the colon. This is unfortunate, since it naturally prejudices one against his wisdom in choosing operations, the colon-implantation having been conclusively proved to be most disastrous in its result. Wounds, inflammations, fistulæ, and the operative treatment of tumors of the bladder are duly taken up. In the treatment of tumors no mention is made of Fenwick's admirable caisson. In considering partial and total resection of the bladder, the most recent literature does not receive due attention. Lithotrity is evidently not in favor with the author; indeed, from the standpoint of the logician, he completely proves his case against it in this manner: "Even those who are most in favor of lithotrity," he says, "acknowledge that it has contraindictions. Lithotomy has no contraindications, hence lithotomy is to be preferred." Thus with a touch of French wit does he add sprightliness to his writing, though somewhat at the expense of its authority. To add to his statement that lithotomy is the method of choice is in these days bad enough, but to state that suprapubic lithotomy should be preferred as a general rule is absolutely unbearable. The various methods of suprapubic cystotomy, including those of Trendelenburg—*i. e.*, transverse incision of Helferich, in which there is a preliminary resection of the pubis, and Tuffier (sympyhsiotomy)—are described at length, as are the various low operations. Some illustrations of suture of the bladder are given. In treating disease of the prostate, and particularly in the chapter upon hypertrophy, the operative treatment receives but scant notice. Total castration is mentioned as a means of curing prostatic enlargement, but no mention is made of White, to whom is due the credit for the introduction of this treatment. Indeed, it is clear that Rochet reads no American journals and very few in the English language.

As a whole, his work is disappointing; he has the knack of happy description, but not one of fortunate selection. He, no doubt, represents very well the practices and the knowledge of himself and his colleagues at Lyons. As representing the most recent advances and the best operative technique as portrayed, his book is in some respects a failure. It does not compare, for instance, in excellence with Fenwick's work. It is of little use to students and general practitioners. To the specialist it is most serviceable, since it gives him the technique of a number of operations which, without this work, he could only find with much difficulty, and often obscured rather than elucidated by the cumbersome phraseology of the original portrait. E. M.

RELATIONS OF DISEASES OF THE EYE TO GENERAL DISEASES. By MAX KNIES, M.D. Forming a Supplementary Volume to Every Manual and Text-book of Practical Medicine and Ophthalmology. Edited by HENRY D. NOYES, A.M., M.D. New York: William Wood & Co., 1895.

DR. NOYES, to quote his own words, "in presenting this treatise of Professor Knies in an English dress, has given a book whose quality is to a great degree unique, a larger field of usefulness." There is no doubt that English-speaking ophthalmologists will appreciate his unselfish task, because, although Dr. Noyes has not himself performed the labor of translation, he has carefully compared the pages with the original, and while he has not added many personal observations, those which are included distinctly increase the value of the work.

The book comprises nine chapters, opening with one on diseases of the nervous system, which includes the anatomical course of the nerves of the eye, the disorders in the domain of the ocular nerves and their central origin, the relation between the bloodvessels and the eye, the relation between the eye and the lymphatics, and, finally, the individual diseases of the brain, spinal cord, and nerves. These subheadings give some idea of the scope of this chapter, which is *facile princeps* of the entire work. Indeed, in order to approach this book in a proper spirit one must, like the author, have made it a favorite study to trace the relationship between the disease of the eye and the disease of the rest of the body, particularly the relationship which exists between ophthalmology and neurology.

A notable feature in the opening chapter is the care with which the researches, often contradictory, pertaining to the anatomical course of the nerves of the eyes, the nerve nuclei of the motor and sensory cerebral nerves, and the regions of cortical visual impressions have been studied and analyzed.

The arrangement of the system of fibres in the chiasm which is given corresponds in the main with the investigations of Gudden, and although Michel's theory of total decussation is mentioned it is not commended. Knies follows Perlia's description of the nucleus of the oculomotor. In the section devoted to the cortical disorders of vision Henschen's recent monograph could not be utilized, but Dr. Noyes has supplied this deficiency in several brief notes. There is an excellent exposition of hemianopsia and the lesions which cause this defect of vision, full consideration being given to the rarer types of half-vision as well as half-color-vision—hemiachromatopsia—and of homonymous hemiopic hallucinations, and to the relation of these phenomena to the localization of intracranial disease.

Touching the question of nomenclature, the following paragraph is interesting:

"It would be advisable to employ special technical expressions for the different kinds of central and peripheral visual disorders. I would recommend that amblyopia and amaurosis be used solely for peripheral (and the rare intermediate) disorders, and the words terminating in "opsia" for central disorders of vision. In the former the light-reflexes of the pupil are also disturbed, and atrophic changes in the nerve, which are visible with the ophthalmoscope, usually occur sooner or later; in the other forms this is not true. The visual disorders of the tractus and those which are located in the

chiasm would then be called hemiamaurosis and hemiamblyopia (homonymous, binasal, bitemporal, incomplete, symmetrical). Hemianopsia would be reserved for central half-blindness and would always be homonymous. Anopsia would mean central blindness (cortical blindness), and the term miopsia (= seeing less) could be introduced for central diminution of vision. Hemimiopsia would then mean those cortical homonymous disorders of vision which do not amount to complete hemianopsia."

Disorders of the voluntary ocular muscles, the transcortical disorders of vision, and word-blindness, alexia, dyslexia, paralexia, agraphia; in fact, all the important clinical forms of what Knies calls the optical disorders of speech are amply considered.

There is a good description of the anomalies of the iris-movements, and the abnormalities in the size of the pupil of central character are considered in four divisions, namely, paralytic cerebral mydriasis (paralysis of the sphincter); spastic cerebral myosis (spasm of the sphincter); paralytic spinal myosis (paralysis of the dilator); and spastic spinal mydriasis (spasm of the dilator). The latter form is made to include dilatation of the pupil after cutaneous irritation.

Succeeding the pure anatomical and physiological considerations of the first chapter, which comprise more than one hundred pages, are the paragraphs devoted to the consideration of the individual diseases of the brain, cord, and nerves.

The remainder of the book is taken up with diseases of the skin, and of the digestive, respiratory, circulatory, urinary, and sexual organs. Then follows an excellent chapter on poisons and infectious diseases, and the book closes with a consideration of the constitutional diseases and their relation to the eye.

Everywhere one is struck with the enormous amount of literature that has been reviewed in the preparation of this treatise, but is impressed somewhat unfavorably with the numerous second-hand references, the constant appearance of "Jahr. f. Aug.," indicating that the author has not always gone to the fountain-head for his information. In not a few instances this neglect has led him into error. American literature has been utilized to some extent, but not by any means as much as it deserves, and almost always through the medium of German abstracts. To a certain extent the same criticism applies to the English ophthalmic literature.

A very interesting chapter, before referred to, is the one devoted to poisons. It contains in many respects the best account extant of the toxic amblyopias, in the widest acceptation of this term. To be sure, the account is brief, but the salient points of this important topic have been included.

Knies commits the great sin of failing to attribute epilepsy, Sydenham's chorea, and gastric disturbances to the influence of eye-strain, although, so far as chorea is concerned, he does not forget to mention it. We trust he may pardoned, if for no other reason, at least for the sake of the admirable construction of his first chapter. It is to be regretted, however, that he did not include a chapter on the relation of eye-strain to general disorders, or, at least, its relation to various disturbances of functions—a relation which abundant clinical evidence proves is a potent one. It is still more to be regretted that Dr. Noyes did not find time to add a chapter of this character, for no one better than he could have treated this subject with judicial fairness, aided by abundant experience.

The index is wretched—a very serious fault—and sometimes one is obliged to read many pages, and even then unsuccessfully, before coming upon the desired topic, which should have been found at once by reference to a proper index. The translator has evidently followed the original exactly in this respect, but the value of the English translation would have been greatly increased had Dr. Noyes permitted the addition of an index as thorough and copious as the one in his own excellent treatise on disease of the eye. Not without faults—and what book is so fortunate?—this treatise of Professor Knies is a monument of industry—a truly scientific work, and amply sustains its author's assertion that it forms a supplementary volume to every manual and text-book of practical medicine and ophthalmology. G. E. DE S.

ILLUSTRATED DICTIONARY OF MEDICINE, BIOLOGY, AND ALLIED SCIENCES. By GEORGE M. GOULD, A.M., M.D. 1633 pages, fully illustrated. Philadelphia: P. Blakiston, Son & Co., 1894.

MEDICAL literature was enriched during the past year by the completion of Foster's splendid work, by the new and revised edition of Dunglison, by Duane's excellent work, and with the volume under consideration. The first two were well known to the profession; the former through its early volumes and the latter through many years of distinguished and acceptable merit. Gould's *Dictionary* had been preceded by his smaller works, which had proved most useful to medical students. The present book was adapted for the profession at large, and was completed with an endeavor to give the greatest possible amount of clear and condensed information in a single volume.

We have subjected this book to the test of daily use for more than a year. Our requirements have embraced the knowledge usually desired by practitioners, and important references demanded by especial study and scientific work, and in the literature of a specialty. The book has been to us all that the writer claims, the greatest amount of condensed information readily contained within a single volume. There are various points upon spelling and the definition of terms used in the literature of specialties in which we do not agree with the work of the author, but this does not militate against the value of the book, nor lessen the debt of obligation to which the profession has been placed by the writer.

The publisher informs us that a second edition is in preparation, and this will certainly be welcome in view of the merit of the first.

The publisher's work upon this book, so far as printing and binding go, has been well and clearly done. Most of the illustrations are excellent, and the exceptions are too few to affect essentially the value of the book. The work compares most favorably with the best medical dictionaries of other languages. E. P. D.

PROGRESS
OF
MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF
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Argonin.

Dr. Arthur Liebrecht states that this new silver-salt is prepared from the sodium combination with casein mixed with silver nitrate and treated with alcohol, which throws down a fine white powder which has been named as above. It is easily soluble in hot water, but in cold with difficulty. Meyer believed this drug to possess antiseptic properties of no inconsiderable value. In watery solution, however, this property is less marked than of silver nitrate, but, on the contrary, upon albuminous solutions it is of greater antiseptic value. Hypodermatic injections show that the symptoms of metallic poisoning appear more quickly with this remedy than with the nitrate; whether this is due to the more rapid absorption or to the peculiar combination of the metal is not at present determined. In conclusion, this remedy apparently possesses the bacteriocidal, but is without the caustic, properties of the nitrate.—*Therapeutische Monatshefte*, 1895, Heft 6, S. 306.

The Treatment of Fetid Expectoration by the Vapor of Coal-tar Creosote.

Dr. Arnold Chaplin has experimented with the preparation which is used principally for seasoning railway sleepers and telegraph-poles. Its chief constituents are phenates and acridin and pyridine bases, all of which are of high antiseptic value. If heated to near boiling, it gives off a dense, pungent, irritating vapor, causing running from the eyes and nose, and a smarting sensation is felt down the trachea and bronchi. So soon as the vapor gains access to that part of the respiratory tract coughing comes on, and whatever phlegm there may be in the bronchial tubes is expelled. After inhalation the breath has for several hours a distinct odor of the vapor. The properties of this vapor are: (1) it is penetrating and capable of reaching the dilated bronchus; (2) it is irritating, and thereby able to cause, by inducing

cough, expulsion of the retained and decomposed matter; (3) it is antiseptic, and may be able to render the bronchiectasis, which it reaches, free from the putrefactive germs which cause the fetor. A nearly air-tight chamber about seven feet square and eight feet high was built outside the hospital and connected with it by a porch. Within this room creosote was vaporized in a flat, open dish by heating with an alcohol-lamp. The inhalations lasted from one-half to one and one-half hours daily for six weeks. By protecting the eyes with watch-glasses framed in adhesive plaster and plugging the nostrils with cotton the irritation was reduced to bearable limits. The effects of these inhalations are (1) upon expectoration. If after a periodic fit of coughing, when it may be presumed that the tubes are empty, an inhalation is made, one is astonished at the large amount of phlegm which is expelled, and this is the phlegm which, under ordinary circumstances, would have remained behind and would have decomposed and become inexpressibly foul. As the treatment progresses the amount of expectoration rapidly diminishes and the fetor entirely disappears; (2) the chest feels freer and less clogged, and more air can be drawn into the lungs; (3) the dyspnœa diminishes, and staircases are mounted with ease; (4) the appetite returns, the tongue becomes cleaner, the strength increases, the temperature-curve ceases to be hectic, and the pulse becomes less frequent; (5) on auscultation the evidences of bronchiectasis, which were difficult to establish because of the retained phlegm filling the cavity, are less marked, and there are now heard, almost continually, hollow breathing-sounds with but few bubbling râles. He concludes: (1) The usual treatment of fetid expectoration is unsatisfactory, and, as a rule, leads to but little permanent benefit. (2) The onset of fetor in the phlegm is sufficiently grave to demand a trial of any new method of treatment. (3) The form of treatment upon which this paper is based offers a prospect of amelioration, or even cure, to the victim of this complaint such as will favorably compare with other ways of dealing with it. (4) The application of the method is easy, attended with no danger, and cheap, a gallon of creosote costing less than twenty cents.—*British Medical Journal*, 1895, No. 1799, p. 1371.

The Use of Creolin-inunctions in Laryngeal Tuberculosis.

Dr. Schadewald reports a patient who presented a limited pulmonary tuberculosis, and upon whom he demonstrated two healed and one existing ulcer of the larynx. He made use of good (not old) cresol (ortho-cresol), the total amount employed being about seven ounces, which was energetically rubbed into the body, each application lasting from fifteen to twenty minutes. It is well to incorporate lanolin with it to prevent adhesions to the linen, which would cause cutaneous irritation. During the treatment the ulceration disappeared.—*Berliner klinische Wochenschrift*, 1895, No. 24, S. 529.

The Treatment of Typhoid Fever.

Dr. C. A. Ray reports eighty-one cases with three deaths. The treatment consisted of an initial dose of calomel, which was followed within twenty-four hours by a reduction of temperature. Hydrochloric acid was given with a pepsin preparation in all cases. Salol, enteric creosote pills, and quinine in

solution were used where intestinal antiseptics were indicated. Ice-water was given as much as the patients wished to drink. Constipation was treated by enemata of warm water. No laxatives were administered excepting in cases where the diarrhœa did not respond to ordinary remedies and the presence of foreign matter was suspected. Brandy, strophanthus, and strychnine were used to combat heart-failure. In most cases the temperature was reduced by baths and iced-water enemata; in some of the more robust, acetanilid, phenacetin, and antipyrin met the same indication. The diet was almost exclusively peptonized or sterilized milk.—*New York Medical Record*, 1895, No. 1280, p. 615.

Dr. A. G. Henry insists upon a quiet, fair-sized, well-lighted room. He withholds food of all description for from four or five days to two weeks, depending upon the behavior of the fever and the condition of the bowels. Milk boiled for ten minutes is then used, beginning with a tablespoonful three times daily and increasing the amount until a half-cupful is taken at a time, but no more than this amount is given until several days after the last vestige of the fever has disappeared, when other articles may be gradually substituted for the milk. The patient should be bathed every two to six hours in water of a temperature of from 75° to 90° F., the higher the fever the lower the temperature of the water to be employed. Of the drugs employed, aconite in small doses is useful, and if there is persistent headache belladonna may be useful. For the diarrhœa five drops of the fluid extract of *baptisia tinctorium* may be combined with the aconite. Large quantities of pure soft water, cold or hot, are absolutely essential to the successful management of the disease. During twenty-one years but two patients have died of intestinal hemorrhage, and during the past seven there has not been a single fatal result, fifteen to twenty-five patients being under observation each season.—*Ibid.*, No. 1281, p. 646.

Guaiacol in Typhoid Fever.

Dr. James Stratton Carpenter proposes this remedy used epidermatically for the reduction of temperature. He is positive in his declaration that it is an undoubted aid in the lowering of high temperature, and whatever unpleasant symptoms may arise from its use need not be considered, under proper care, as tending to more than temporary discomfort, while necessary attention to the simplest rules of nursing will avoid them altogether. About forty cases were under observation. The site for the application was usually the epigastrium. In some cases the continued application was followed by a dermatitis, but this was exceptional. The rubbing-in process being completed, a layer of cotton was held in place over the spot, and within half an hour the effects of the application would generally begin to manifest themselves in a more or less profuse perspiration, followed by an appreciable fall of temperature, which in turn was followed by a rise within varying periods of time. Thirty-five drops were the maximum dose employed, the usual one being fifteen to twenty drops; but when this was shown to be insufficient the dosage should be gradually increased until a temperature-fall occurs. There is no limit as to the frequency of employment. There is no fear of collapse, and robust cases were not selected for the exhibition of the

remedy. Urgency of symptoms only is the guide to frequency of dosage. As adjuncts to the use of this remedy quinine, phenacetin, alcohol, and cold water have been used. Of these, cold water gave the best results when employed in the form of light spongings. No complaints were made as to the taste of the drug, nor was there noted any odor of the breath nor of the urine, therefore there are no data as to its elimination in these particular cases.—*Therapeutic Gazette*, 1895, No. 6, p. 369.

Spermine Solution.

Dr. George E. Krieger defines this substance as a physiological tonic in all cases of depressed or exhausted conditions. The clinical reports are upon asthma, one instance of relief of this symptom; anæmia and dyspepsia, two successful cases; chorea, two cases; diabetes and Bright's disease, improvement noted; bronchial catarrh, several patients relieved; tuberculosis and other infectious diseases, greatly improved; typhoid fever, malaria, pneumonia, beneficial results; syphilis and chronic ulcers, cured or benefited; neurasthenia and neuralgia, pronounced effects; locomotor ataxia and spinal degenerations, no satisfactory results. The dose is from five to ten minims (adults), three to six minims (children), hypodermatically, increasing one minim each day until the full dose of fifteen minims is reached. The site of the injection is not important so long as strict asepsis is observed. No untoward effects follow, and the treatment should be continued for at least two weeks before any conclusion may be made as to its value.—*The American Therapist*, 1895, No. 12, p. 312.

The Treatment of Chlorosis.

Dr. Potain states that the usual indications are: general stimulants, salt-baths, sea-bathing, dry douches, moderate physical exercise, intellectual work according to the condition of the patient, avoidances of nervous excitement, emotions, marriage being far from beneficial. Iron should be given in addition to the food, which should be strengthening. The phosphates or glycero-phosphates can be administered. The cardiac disturbances, as palpitation and dilatation, should be treated, the former by sodium bromide, valerian, and camphor; the latter, which frequently depends upon dyspepsia, by a well-chosen and regulated diet. In painful dyspepsia, when drugs are badly borne, soluble iron-preparations, or iron mineral-waters, or, in extreme cases, hypodermatic injections, or even injections of defibrinated blood, should be employed. In atonic dyspepsia, with deficient hydrochloric acid, the alkalies, or careful hygiene alone, can render good service; suppress alcohol and wines. Inhalations of oxygen may be useful. In chronic gastric repletion, with dilatation of the stomach, lavage, or in addition electrization, the negative pole in the stomach, can be employed. In dyspepsia with loss of appetite, a very serious symptom, change of scene is best, but this cannot always be relied upon. For neuropathic chlorotics of the atonic variety, gymnastics, voyages, and exercise must be advised. For those of exaggerated excitability, repose, even in bed, limited alimentation, avoidance of fatigue, country rest are important. For chlorosis complicated by other conditions the latter must be attended to. If with this we have tuberculosis, the treatment is

important; arsenic and manganese are to be used. If the tuberculosis is congestive, the danger is imminent, and the congestion must be subdued. In the torpid varieties iron renders good service. In chlorosis complicated by aortic insufficiency the blood must be built up. If by mitral obstruction the chlorosis exaggerates the cardiac symptoms—and that is the greater reason for treating the disease—iron in these cases succeeds very well.—*Bulletin Général de Thérapeutique*, 1895, 22e liv. p. 307.

Cancer and Serum-therapy.

Dr. Ch. Eloy critically reviews the papers which are familiar to readers of current literature. Practically there are two methods of procedure against cancer: (1) the streptococcal by erysipelas-serum, (2) the anticancerous by the Krebs-serum. Accidents from the use of the methods and failures have been published, and the brilliant results which have been announced have been neutralized by the testimony of other observers. Doubtless insufficient time has been allowed to elapse before the publication of their results. So far as developing a theory for the action is concerned, Kronacker has shown that incidental inflammatory processes often have a favorable influence upon the infectious processes of the cancer. Domergue has also shown that inflammation can diminish the development of cancerous tumors. This is the explanation of the temporary improvement obtained with caustics, phosphorated oil, picric acid, zinc chloride acting somewhat upon the diseased as upon the healthy tissues; with aniline derivatives, pyoctanin, methylene-blue producing momentary retrogressions; with essence of turpentine producing a local inflammation without febrile reaction, without general infection, and with some benefit. There is nothing to prove that cancer is of bacterial origin; this theory arose from the necessities of serum-therapy. The clinical facts more or less favorable to the serum-therapy of cancer are hardly numerous. The least unfavorable are moderately conclusive. As for the experimental results, it is difficult to draw conclusions from them. Without other proof we are not justified in ascribing specific properties to the erysipelas-serum or to the Krebs-serum. In these, as in other matters of therapeutics, it is necessary to have great circumspection and to act in good faith.—*Journal des Praticiens*, 1895, No. 24, p. 372.

The Treatment of Sterility.

Dr. Gustav Loimann recommends very highly the carbon-dioxide baths. Although these baths have come down to us from antiquity, yet their simplicity and ease of application have not been conducive to their employment. These baths increase the sexual excitability, especially in women, and are a valuable remedy for amenorrhœa or deferred menstruation. The use of natural carbon-dioxide baths is easy and pleasant. The clothing should be so arranged that it will not embarrass respiration, and the lower part of the body is immersed The immediate result of the bath is a feeling of warmth and a peculiar sensation in the genitals. The duration of the bath is from eight to fifteen minutes. In special cases the mud-bath may be combined with these.—*Therapeutische Monatshefte*, 1895, Heft 6, S. 295.

Psoriasis Treated with Oil of Copaiba.

Dr. J. Abbott Cantrell reports two cases which demonstrate the good results which may be obtained by the use of this remedy. The amount used was five minims in capsules three times daily. In addition good nourishing diet and free access to open-air exercise were prescribed. In both instances the disease was of long standing, and had been shown to be rebellious to several methods of treatment.—*Therapeutic Gazette*, 1895, No. 6, p. 368.

The First Aid in Poisoning.

Dr. L. Lewin notes that there must be considered: (1) that the poison shall be rapidly and completely removed from the body; (2) that it, so far as may be, shall be so chemically changed that it temporarily or permanently loses its harmful properties; (3) that the functions of single organs or of the entire body disturbed by it shall be restored by proper remedies. To remove the poison from the body the stomach-tube offers the fewest objections and possesses many advantages, and with a bulb-attachment (such as is found in this country on the Davison syringe) thorough washing out of the stomach can be carried out. The water which is used may be impregnated with various substances according to the poison ingested; *e. g.*, copper sulphate for phosphorus, magnesium sulphate for carbolic acid, lime-water for oxalic acid, zinc sulphate for lead acetate, diluted lead-solution for chromic acid. Marked pain may be relieved by solution of cocaine (0.05 to 0.10 in 1000 of water). If the tube cannot be passed because of swelling of the parts, emetics are necessary. Oily or fatty remedies or large quantities of fluids (warm water) should not be employed lest the solubility of the poison be increased. As permissible emetics only three are mentioned: good powdered mustard (two to two and one-half drachms in a glass of water), copper sulphate (fifteen grains), or apomorphine hydrochlorate (one-third of a grain), the last given hypodermatically. For those poisons which are insoluble in the stomach, but soluble in the intestines, Rochelle salt in from 150 to 300 grains dissolved in water is the best antidote. When the poison is circulating in the blood every effort should be made to prevent the destruction of the blood-corpuscles and the subsequent blocking up of the renal tubules. For this purpose the solution of potassium acetate, or, better, potassium and sodium boro-tartrate (tartarus boraxatus), 1 to 20 of water, should be placed in the stomach. To make the poison chemically inactive the neutralization of acids by alkalies, of alkalies by acids, phosphorus by copper sulphate, oxalic acid by lime-water, should be done; but if the poison is circulating in the blood, this chemical reaction is not likely to take place. To combat the symptoms which are usually urgent, as advancing heart-failure, disturbance of respiration, commencing cerebral paralysis, severe cramps, and changes in blood-corpuscles, various methods are of necessity employed. To stimulate the heart the use of the rectum is preferable to subcutaneous medication. Ammonia (30 drops in a glass of water), alcohol (a teaspoonful of brandy in a glass of water with a little mucilage of gum-arabic), oil of camphor (one-half to one teaspoonful in an indifferent oil), and coffee-injections may be employed. When the respiration is interfered with, a stream of cold water

projected from a height against the neck of the patient, who is protected from further wetting by a handkerchief about the lower part of the neck, is the quickest and safest restorative. The various methods of artificial respiration, or Laborde's tongue-traction, may be useful. For cerebral paralysis forced walking (ambulatory treatment), mustard with lukewarm water to neck, feet, or stomach, ammonia-water, even vesication, are employed. Of internal remedies, tincture of musk hypodermatically holds the first place. Camphor-solutions, small doses of strong wine or brandy, or coffee-infusions by the rectum are serviceable. For cramps, the anæsthetics, as ether and chloroform, are useful; in strychnine-poisoning the latter is especially so, and should be continued until the poison is completely removed from the body. Chloral, because of its paralyzing effect upon the heart, is particularly to be avoided. The changes in the red blood-corpuscles may be antagonized by venesection and transfusion of double the quantity removed of six-tenths per cent. of sodium-chloride solution, to which one-tenth of one per cent. of soda is added.—*Berliner klinische Wochenschrift*, 1895, No. 24, S. 513.

Potassium Permanganate.

Dr. William Moon shows that this drug decomposes morphine sulphate much more rapidly than it does albuminous matter, so that, when ingested, the contents of the stomach will not reduce it so quickly that it becomes useless for antidotal purposes. In case of poisoning by any of the morphine-salts eight or ten grains of this drug should be dissolved in a pint of water and administered at once; this amount should be repeated at intervals of thirty minutes once or twice. If the alkaloid morphine (not its salts) or opium or any of its preparations have been taken, it is advisable to acidulate the antidotal solution with one or two teaspoonfuls of diluted sulphuric acid or white (not red) vinegar, by which the insoluble morphine will be converted into its sulphate or acetate. The amount of antidote to be used depends upon the amount of poison which has been taken, generally one grain more than of the poison. If swallowing is impossible, in order not to increase the existing cerebral congestion by the use of the stomach-tube a hard-rubber catheter can be introduced into the œsophagus by way of the nose. To this can be attached a piece of soft-rubber tubing fitted with a funnel into which the solution can be poured; even after all of the opium or morphine which is in the stomach is supposed to have been rendered inert, a weak solution, one grain to the tumblerful of water, should be administered by the mouth because of the elimination of the poison, which is in the circulation, into the stomach. [*See* American Journal of the Medical Sciences, vol. cix. p. 80.—R. W. W.] The hypodermatic injection of the antidote is also of benefit; although a part of the potassium permanganate is reduced by the subcutaneous tissues, yet enough finds its way into the circulation to select the morphine which is circulating in the albuminous constituents of the blood. As regards other alkaloids and inorganic poisons, several hours' contact with atropine, hyoscyamine, hyoscine, cocaine, aconitine, veratrine, pilocarpine, muscarine, caffeine, and phosphorus produced no oxidizing effect. While no reaction follows the contact of hydrocyanic acid with the drug, the latter immediately decomposes potassium cyanide. It will give up

its oxygen much more quickly to albuminous matter than to strychnine, oxalic acid, and colchicum preparations. With eserine the results are the same as with morphine, therefore to opium and calabar bean it is a positive antidote. Thus far thirty-five cases of opium-poisoning have been successfully treated by this method.—*The British Medical Journal*, 1895, No. 1799, p. 1369.

Digitoxin.

M. G. Corin notes the varying activity of the various commercial digitalins, and the skepticism with which the announcement of a new active principle is received. Schmiedeberg has isolated four non-nitrogenous active principles—digitonin, digitalin, digitalein, and digitoxin—of which the first three are glucosides and the last three act upon the heart after the manner of digitalis. Unfortunately, the digitalin and digitalein are difficult to obtain pure, and digitoxin is almost insoluble in water. The last presents all of the valuable properties of digitalis; it increases the volume of the pulse, raises the blood-pressure from its stimulation of the myocardium, slows the pulse-rate from its action upon the inhibitory apparatus, both central and peripheral. Personal experiences with this drug in dose of one-sixteenth of a grain demonstrated disagreeable phenomena, but never alarming ones. There was a marked slowing of the pulse, which naturally was of increased tension, and nausea and vomiting, which lasted but a few hours. The formula which is employed is: digitoxin, one-sixty-fourth of a grain; chloroform, ten minims; 90 per cent. alcohol, one drachm in an ounce of distilled water, this representing one dose. This solution does not precipitate with water, nor with normal saline solution. Masius has clearly shown the superiority of digitoxin above the commercial digitalins and preparations of digitalis in the treatment of cardiac asthenia and pneumonia. The author has given the theoretical reasons and practical facts which go to show that digitoxin has a real abortive action upon pneumonic infections. As these observations increase in number the practical physician will substitute this active principle for the preparations of digitalis, which are of varying activity and which may even be dangerous.—*Les Nouveaux Remèdes*, 1895, No. 9, p. 196.

Disinfection by Formaldehyde.

Dr. G. Bardet confesses to considerable skepticism as to the possibility of absolute scientific sterilization of the more virulent germs resulting from the inoculation of cultures which are notoriously pathogenic and which are previously placed where disinfection is to be later performed. Hitherto he has considered this problem unsolvable. However at the present time making use of this remedy, also known as formal, in solution with methyl alcohol, and in an apparatus devised by Trillat, a different opinion is entertained. Practical experience has demonstrated that continuous operation of this apparatus in a closed room results in thorough disinfection, which has been proved by bacteriological cultures. The action of formal on wood, metals, and hangings is practically *nil*. The drug penetrates to a considerable extent; it impregnates furniture and bedding, as is shown by the presence of its peculiar odor. This odor can be removed by thorough ventilation, by entering the

room six hours after the completion of the operation, for the purpose of opening the windows. Within a quarter of an hour or more the air can be breathed, but should the room be again closed the formal which has impregna'ed the walls will be disengaged and the air will again become irrespirable. It is better, then, to allow a current of air to circulate through the apartment for twenty-four hours; at the end of this time the odor will have completely disappeared. In case of necessity, an aëration of four hours will be sufficient to render the room habitable.—*Les Nouveaux Remèdes*, 1895, No. 10, p. 219.

MEDICINE.

UNDER THE CHARGE OF

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Displacements of the Liver.

Graham (*Canadian Practitioner*, June, 1895) states that within certain limits the liver is freely movable, and that in women with pendulous abdomens it may descend one inch below its normal position without causing any unpleasant symptoms. Cases with marked undoubted displacement of the liver are rare, however.

A short account of the literature on the subject is given, also a representation of Heister's remarkable case, published in 1754, in which the normal transverse diameter of the liver had become practically vertical. In 1892 Faure published fifty-four cases collected from the literature. Since then several others have been reported, and these have been collected, making a total of seventy cases, which are given in tabulated form.

The author is of the opinion that the recorded cases might be divided into two classes: (1) the wanderleber of the Germans, fegato ambulante of the Italians, floating liver, a condition found in women with pendulous abdomens, usually after frequent childbearing; (2) cases in both males and females in which the causes of displacement are varied.

Floating liver is a comparatively rare condition, any marked degree of mobility of this organ being prevented by the number and strength of its ligaments. The ligaments are in all probability of sufficient strength to carry the full weight of the liver without the aid of the abdominal wall. This the writer has demonstrated in the majority of a series of experiments on the cadaver, the details of which are given. The strength of the ligaments of the liver are further shown by the results of several experiments which Faure conducted, in which he found that it took a weight twenty-five times that of the liver in order to rupture them.

Graham reports three cases which occurred in his practice, one of which illustrates well the great relief to the symptoms produced by hepatic displacement by the use of a properly applied abdominal support. In this case relative hepatic dulness did not begin till the seventh rib in the mammillary line was reached, and the lower border of the liver was distinctly palpable two inches below the umbilicus. The patient complained of a weight in the abdomen, dyspnœa, and was very cyanotic. These symptoms were relieved by an abdominal bandage, always returning whenever it was removed.

Winkler is quoted as giving the following causes for hepatic displacement, one acting in succession to the other: (1) Pregnancy of full term; (2) pendulous abdomen; (3) hepar pendens; (4) stretching of the ligaments; (5) tearing and twisting of the suspensory ligaments. Rapid emaciation and disappearance of the abdominal fat are considered by Landau as causes of displacement. Other etiological factors which have been mentioned are coughing, sneezing, vomiting, and tight-lacing, the latter, however, tending more to produce a change in form rather than a change in position of the organ. Repeated pregnancies in women, producing pendulous abdomens, seem to be an important etiological factor. Of the cases recorded a synopsis shows that males and females are affected in the proportion of one to four. Displacement comes on later in life in females than in males.

The symptoms usually complained of by patients are a feeling of weight in the abdomen and a dull pain on exertion. A few instances have been recorded with a sudden onset of symptoms, which were those practically of shock. Other symptoms which have been noted are dyspnœa, cyanosis, nausea, vomiting, and, in some cases, jaundice. An examination of the abdomen should show the presence of a tumor, which can be easily felt and which resembles the liver in size, shape, and consistence. There should be tympanitic resonance over the area where hepatic dulness normally exists.

The conditions for which a floating liver is most likely to be mistaken are typhlitis, ovarian cyst, movable right kidney, and hydronephrosis. The former condition should be distinguished by the following points: (1) The tumor having an upper smooth surface and a sharply defined anterior border and notch; (2) tympanitic resonance over the normal area of liver-dulness; (3) possibility of partial or complete replacement, when dulness will be found in the normal area.

Greatest relief to the symptoms seems to have been obtained by the use of a properly applied abdominal support. Cases of operation with recovery are reported.

Bacteria in the Healthy Nose.

Thomson and Hewlett in a recent paper demonstrate the fallacy of the generally accepted idea that the healthy nasal cavity is rich in micro-organisms.

The authors made no attempt to differentiate the varieties of organisms found, but simply considered their number.

In making their research they differentiate between the vestibule, which is lined by skin and contains hairs and sudoriparous and sebaceous follicles, and the nasal cavity proper, which is lined by mucous membrane.

In the vestibule micro-organisms were never absent, and generally abundant.

From the Schneiderian membrane eighty per cent. of the cultures were sterile, showing that the presence of micro-organisms in the nasal cavity is the exception.

Considering that at a conservative estimate 500 litres of air bearing 1500 organisms are inspired every hour, the authors find it difficult to explain this sterility of the nasal cavity; they are of opinion that many organisms are arrested by the vibrissæ in the vestibule and a few removed by phagocytosis.

The protective power of the ciliated epithelium and the microbial action of the nasal mucus were also suggested as possible explanations.—*Lancet*, June 1, 1895.

Mixed Lung-infection of Aspergillus and Tubercle Bacillus.

Rénon and Sargent report the results of the autopsy on a case of mixed infection of the aspergillus fumigatus and the tubercle bacillus occurring in a pigeon-feeder.

The patient died of progressive asphyxia, and was not cachectic. The lungs showed much thickened pleuræ and a great deal of fibrous change. Scattered throughout the lung-substance were numerous small nodules which looked like tubercles, but which, microscopically, were found to be made up of masses of cubical cells containing neither lymphoid nor giant cells and surrounded by sclerotic tissue.

Besides these areas there were others of a caseous nature containing a few giant cells.

Neither the aspergillus nor the tubercle bacillus was found in stained sections.

The writers had followed the case from its onset, and conclude from observing this case and reviewing the literature that in similar cases of mixed infection the aspergillus first attacks the lung and paves the way for the tubercle bacillus; when the latter has gained a foothold the aspergillus disappears, leaving a very chronic form of tuberculosis, with a strong tendency to the formation of fibrous tissue and the disappearance of the bacilli.—*Compt. Rendus de la Société de Biologie*, May 3, 1895.

Grave Icterus due to Proteus Infection.

Bar and Rénon report a case of fatal icterus in a newborn baby whose mother was manifestly syphilitic.

The child was born apparently healthy, but fever appeared on the second day after birth, followed the next day by icterus, which rapidly increased in intensity, the child dying on the fifth day.

At the autopsy a large liver, containing numerous gummata in an early state, was found.

Cultures from the liver, spleen, and heart's blood gave a single organism corresponding in every way to the proteus vulgaris. Sections of the liver showed the intracellular spaces to be crowded with the same organism.

The authors consider the icterus, judging by the course of the disease, to

have been due to the infection and not to the hepatic syphilis, and call attention to the analogy between this case and cases of Weil's disease due to the proteus.—*Comptes Rendus de la Société de Biologie*, May 24, 1895.

The Presence of the Tubercle Bacillus in the Blood of the Umbilical Vein of Children Born of Tuberculous Mothers.

Bar and Rénon have recently, in five cases where children were born to tuberculous mothers, collected at the time of birth small quantities of the blood flowing from the placenta, which they inoculated into guinea-pigs.

In two of these cases, in both of which the tuberculosis in the mother was far advanced, the results were positive, the animals dying with marked local tuberculosis and also tuberculosis of the internal organs. The bacilli of tuberculosis were recovered from the seat of inoculation in each case. Of the three unsuccessful cases, in two the tuberculosis in the mother was mild and in the third severe. The children in these cases lived and were healthy.

In the positive cases, one child was born dead and the other died shortly after birth of pneumonia. The placenta in both cases appeared normal, and in the case of the dead-born child no appreciable visceral lesions could be made out, though inoculation of pieces of viscera caused tuberculosis in the guinea-pig.—*Comptes Rendus de la Société de Biologie*, July 5, 1895.

Pleuritis due to the Proteus Vulgaris.

Charrin and Nobécourt report the case of a woman seven and a half months pregnant who developed a left-sided pleurisy with severe dyspnœa and grave general depression. The physical signs indicated a small amount of fluid, and exploratory puncture confirmed the indication. The fluid withdrawn was purulent, and had a stale, nauseating, fetid odor; it contained gas and a bacillus which culturally corresponded in every way to the proteus vulgaris.

The patient gradually sank, abortion took place, and death a few hours later.

The child gradually lost weight, and twenty-nine days after birth weighed fifty grammes less than it did at the time of birth.

The autopsy on the mother showed nothing to account for the fatality of so small a pleural effusion, and the authors account for it by the decreased resistance due to pregnancy and the absorption of the toxic products of the proteus, which they consider of a very virulent nature.

The wasting of the child they consider due to poisoning from absorption of toxins from the mother.—*Compt. Rend. de la Société de Biologie*, June 21, 1895.

The Goulstonian Lectures on the Suprarenal Bodies.

Rolleston (*Brit. Med. Journ.*, March 23 and 30, April 6, 1895) dealt with this subject very fully in three lectures, delivered before the Royal College of Physicians of London. The author first describes the special conformation of each gland and its relation to the surrounding structures. Accessory suprarenals not uncommonly occur either in the surrounding connective

tissue or less frequently imbedded in the substance of the kidney or liver, in which case the term "rests" has been applied to them.

The histology of the gland is described. In origin the cortex is supposed to be derived from the mesoblast or the Wolffian body, whilst the medulla is regarded as having the same origin as the sympathetic system, on account of its containing ganglionic cells. The author regards the gland as a functional whole, the cortex and medulla doing the same work, but in unequal degrees. Schäfer and Oliver hold, however, that the medulla alone yields the active principle of the extract.

Atrophy of the suprarenals occurs normally in old age, but may occur earlier in life and cause Addison's disease. Hemorrhage into the substance of the gland may be due to traumatism either late in life or in infants at birth. Fatty and lardaceous degenerations occur, and the glands have been found to contain cysts. Rolleston had examined the suprarenals at 1050 autopsies; in 131 cases death was due to tuberculosis, and in 18 instances the glands were tuberculous, without, however, there being any signs of Addison's disease. Children up to ten years of age seemed to be immune to adrenal tuberculosis. Of simple tumors adenomata are most common. The "rests" may undergo the same change. Sarcomata and carcinomata occur primarily, the former being the commoner. Here, again, the "rests" may become sarcomatous, and thus cause sarcoma of the kidney or liver. Secondary sarcoma and carcinoma of the adrenals also occurs.

Brown-Séquard experimented on animals and found: (1) that the adrenals were essential to life; (2) that suppression of their function was more rapidly fatal than suppression of the secretion of urine; (3) that they modified or destroyed a substance which otherwise transformed itself into pigment and which collected in the blood; (4) that the blood of an animal from whom the glands are removed becomes poisonous and often proves fatal when injected into other animals of the same species. A number of writers hold that Addison's disease is due to an affection of the sympathetic system, and claim that where the adrenals are found to be diseased the symptoms are really due to involvement of the sympathetic nerves in their vicinity. Tizzoni claims that the symptoms produced by the removal of the suprarenals are not due to the cessation of their function, but really to the injury of the sympathetic nerves during the operation.

Schäfer and Oliver have found that injection of the extract of the glands produces (1) a rise in blood-pressure due to arterial constriction; (2) a marked inhibition of the heart, acting through the vagus; (3) a paresis of the muscles, with absence of knee-jerks.

Wilks holds that the lesion of the suprarenals in Addison's disease is very constant; he considers it a primary inflammation, comparable to hepatic cirrhosis. Tuberculosis of the adrenals is considered the most common cause of Addison's disease, although well-authenticated cases have shown the adrenals to possess other lesions. The spleen and the lymph-follicles of the stomach and intestine are generally found enlarged in this disease. The pigmentation in Addison's disease is really an exaggeration of that normally found, the pigment being present in the stratum Malpighii and in the dermis in the "carrier cells," which probably convey it from the bloodvessels to the

epidermis. Pigmentation of the mucous membranes was considered a more valuable diagnostic sign than cutaneous bronzing.

Three theories were held as to the cause of Addison's disease: (1) that it was due to a lesion of the sympathetic system; (2) that the adrenal glands were excretory, removing effete blood-pigment and toxins from the circulation; (3) that their function was secretory, the glands producing some fluid which was necessary to the economy; the interference with the function in the latter two cases producing Addison's disease. The author summed up the arguments in favor of each theory, and stated that the first two were untenable, but was strongly in favor of the view that the function of the suprarenals was excretory.

Treatment of Addison's disease with suprarenal extract had been on the whole satisfactory. Rolleston did not think a quantity of the extract equivalent to two glands daily was too much. Dr. Oliver thought that the extract might be a good hæmostatic in hæmophilia, purpura, etc.

The Urine in Carcinoma.

Duplay, Cazin, and Savoire, in a recent research on the state of the urine in carcinoma, come to entirely different conclusions from Rommelaere, who has insisted on the decrease of urea and phosphates in this disease, independent of alimentation.

The authors conclude that decrease in excretion of urea is not constant in the subjects of carcinoma, and only occurs when the patient can no longer assimilate food. As long as nutrition is assured by a suitable diet excretion of urea is normal even when the carcinomatous lesion is advanced; when alimentation is diminished, however, the excretion of urea is diminished considerably. The decrease in excretion of urea then cannot be considered as symptomatic of cancerous affection, but simply as one of the manifestations that may accompany the cancerous cachexia when the assimilation of food is faulty.

The decrease in excretion of phosphates also is not at all constant in cancer, and does not, any more than the decrease in urea, constitute a diagnostic element.—*Archives Générales de Médecine*, July, 1895.

Leucocytosis in Pneumonia.

Stienon has recently made an exhaustive study of the number and character of the leucocytes in acute pneumonia. He takes up first the question of number, and comes to the conclusion that in most cases the number varies considerably, the increase, as a rule, disappearing with the increase of fever.

With regard to the morphology of the leucocytes he concludes that in the febrile stage the polynuclears predominate, the eosinophiles being very scarce. After the crisis the small mononuclear elements increase greatly. In case of slow resolution the polynuclears remain increased.

As soon as the polynuclears begin to diminish the eosinophiles increase, this increase occurring early in mild cases, and being slight or wanting in cases of suppuration.

Though the polynuclear variety of leucocytes predominates during the

period of leucocytosis as a rule, in certain cases the young forms predominate, this condition persisting during convalescence and often being accompanied by an increase in eosinophiles.

The author has been unable to observe a decrease in leucocytes preliminary to the leucocytosis.—*La Presse Médicale*, July 13, 1895.

Parotitis Secondary to Gastric Ulcer.

In a recent article on secondary parotitis HAWTHORNE reports two cases in which this affection followed gastric ulcer.

In the first case, a female, aged forty-two years, had had constant epigastric pain and almost constant vomiting for three weeks, and a free hematemesis on the morning of admission to the hospital. Previous health had been good except for slight gastric disturbances. Under appropriate treatment the symptoms subsided, but two weeks after admission pain and swelling of the right parotid gland developed with a temperature of 101° F. In forty-eight hours the temperature fell to normal, however, and the swelling disappeared without suppuration.

In the second case, a female, aged twenty-six years, was admitted to the hospital on account of severe hematemesis extending over twenty hours. The hematemesis occurred again three days after admission, and was followed by melæna.

Four days after the second hemorrhage evidence of right parotitis appeared with temperature of 101.8° F. Slight improvement in the local condition occurred under treatment, but in a few days pain and temperature returned and fluctuation was detected in the swelling. The pus was evacuated and the stomach-symptoms disappeared, the patient making a rapid recovery.

The author comments upon the rarity of this complication, and has been able to find only one case where there was even a suspicion of gastric ulceration, this case being doubtful.—*Glasgow Medical Journal*, July, 1895.

Paralysis of the Larynx in Typhoid Fever, Diphtheria, and Influenza.

To the scanty literature concerning post-typhoid laryngeal paralysis LUBLINSKI adds a note on six cases observed by himself (*Berliner klinische Wochenschrift*, 1895, No. 26). In four cases men, in two women, were affected. In one severe case paralysis came on in the fourth week; in the others after defervescence, as in most cases previously reported. In one case a right-sided recurrens paralysis followed pleuro-pneumonia (Schroetter has observed a similar case). Usually, however, the exact causes of the paralysis are obscure. The course in mild cases is favorable, but in double paralysis of the abductors the prognosis is unfavorable and the patients are usually obliged to use the canula. The diagnosis can only be made by laryngoscopic examinations, as hoarseness and dyspnœa may be attributed to disease of the mucous membrane or cartilages. In some cases it is difficult to distinguish between the inflammation of the crico-arytenoid articulation with fixation of the arytenoid, especially as redness and swelling may be slight. Of Lublinski's cases the abductors were paralyzed in two, one recurrent in three,

both recurrent nerves in one case. The most serious is paralysis of the abductors, which causes obstruction of breathing and often necessitates tracheotomy. Usually the condition comes on in convalescence, with inspiratory dyspnœa, but without alteration of the voice. In one case of paralysis of the recurrent nerve the soft palate was also paralyzed, and in another there were paraplegia and loss of reflexes, without anæsthesia. Lublinski also reports some cases of diphtheria treated by antitoxin, in which paralysis occurred very early, the palate being paralyzed in one case on the ninth day, the lower extremities on the twelfth in another. A case is reported in which a patient, a man of forty-three years, convalescent from influenza, became aphonic on the tenth day. Examination showed slight redness of the laryngeal mucous membrane and paralysis of the left vocal cord (posticus). This disappeared in four weeks, after electrical treatment.

The Patellar Reflex in Diabetes Mellitus.

Grube (*Berliner klinische Wochenschrift*, 1895, No. 23), in reporting the conditions in thirty-nine new cases of diabetes, gives the following conclusions: 1. The knee-jerk may be absent in mild or in severe cases of diabetes mellitus. 2. The absence of the reflex is not so frequent as many authors claim. In order to test the reaction it must be tried repeatedly, with all possible precautions. Frequently the reflex is only obtained after two or three trials, especially in women. 3. The influence of age is not certain, but the reflex seems absent more frequently in persons above the age of fifty years. 4. The absence of the reflex is possibly due to a mild inflammation of the sciatic nerve (Eichhorst). This process does not depend on the character of the diabetes, as severe peripheral neuritis may appear in mild cases of diabetes. 5. The absence of the patellar reflex has no prognostic importance. 6. The knee-jerk sometimes remains up to the last in fatal diabetic coma.

Alimentary Glucosuria in Functional Neuroses, Phosphorus-poisoning, and Atrophy of the Liver.

Von Jaksch (*Prager med. Wochenschrift*, 1895, No. 27) calls attention to the importance of alimentary glucosuria in the diagnosis of certain diseases, the most important being "grande hystérie" and traumatic neuroses. The glucosuria can be called forth in these cases by giving the patient one hundred grammes of grape-sugar at one dose and examining the urine up to the end of six hours. Within this time (as well as later) the sugar cannot be found in the urine of healthy people nor in that of patients with various diseases other than those named. Von Jaksch has examined with negative results over one hundred patients, including those with tabes dorsalis, syringomyelia, chorea, multiple neurosis, and various forms of myelitis. In the other diseases the sugar is found in the urine, sometimes in large quantities. The urine must, of course, be tested before giving the grape-sugar in order to determine the absence of glucosuria. Exceptions to the rule in a case of syringomyelia and a case of chorea in pregnant women led to experiments which showed that in ten out of sixteen other pregnant women glucosuria could be produced by the injection of the dose mentioned. The amount of sugar excreted in the urine varied greatly in different cases.

Nerve-lesions in Herpes Zoster.

Ebstein (*Virchow's Archiv*, Bd. 139, H. 3) reports a case of herpes zoster with facial paralysis and another with sensory disturbances, and gives some interesting results of an investigation of the subject. He agrees with the view of Recklinghausen, that there is a primary affection of vasomotor nerves, the vasodilators being irritated, and he looks on the herpes as an intense angioneurotic disturbance which may be associated with diseases of the motor or sensory, spinal or cerebral, nerves. The rare appearance of herpes in cases of motor disturbances, and the cause of the paralytic phenomena in motor nerves and of symptoms of irritation in sensory and vasomotor nerves, cannot be explained. In most cases the disease results from causes acting on the body in general, though trauma and cold may assist. It is possible that infection or auto-intoxication plays a part. The tendency of certain parts of the nervous system to herpes zoster may be due to predisposition of these parts to the special exciting causes.

Intestinal Anthrax.

Krumbholz (*Ziegler's Beiträge zur path. Anat.*, Bd. xvi. H. 2) reports an interesting case of intestinal anthrax with choleraic symptoms, in which the autopsy was made half an hour after death. Both small and large intestines showed numerous hemorrhagic swellings with œdema and hemorrhage of the mucosa. There were ascites and swelling of the spleen and mesenteric and retroperitoneal glands. Bacilli were found in the peritoneal exudate and the blood, which proved on culture to be anthrax bacilli. Microscopic examination showed that the bacilli had entered the lymphatics and increased there, the blood containing relatively few.

SURGERY.

UNDER THE CHARGE OF

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Concerning Subphrenic Abscesses.

Lampe contributes the following to the *Münchener medicinische Wochenschrift*, 1895, No. 20: Regarding the etiology of subphrenic abscess, the author adopts Maydl's classification, which distinguishes twelve groups, although

the cases reported illustrated but five of them. The origin of the largest number of cases is from the stomach. The subphrenic abscesses of this group form in the greater number of cases in consequence of a perforation of a gastric ulcer; but few result from carcinomata of the stomach. The third and fourth decennium furnish the majority of cases. The seat of the abscess dependent upon gastric ulcer will usually be the left subphrenic space; those following carcinoma will usually be on the right side, because the pylorus is most frequently the seat of this form of neoplasm. The mortality of this group is enormously large. In the cases collected by Maydl of thirty-five, twenty-five were not interfered with, and all died. Of ten operated upon, only three were cured.

The case of a patient, twenty-six years old, was then described. He became sick four weeks before with pains in the epigastrium and frequent vomiting; no blood was observed; the pains were always increased by taking food. Ten days past sticking (lancing) pains on the left side were felt on inspiration, and for the past four days there had been severe pain over the entire abdomen. Motion in the left half of the thorax was clearly restrained, pulse small and frequent, abdomen distended, very tender to touch; resonance was impaired over the whole left half of the thorax. The heart had been displaced toward the right. Exploratory puncture of the left side of the chest, in the sixth intercostal space, showed a serous exudation. In the eighth space pus was obtained. Chloroform-narcosis, resection of the ninth rib, evacuation of a large abscess; the upper wall of the cavity was formed by the diaphragm. The patient died on the day of operation. At the section a large left-sided subphrenic abscess was found, the walls of which were the diaphragm, spleen, stomach, and left lobe of the liver; the two latter were glued together to the abdominal wall. On the posterior wall of the stomach, near the lesser curvature, was a perforation allowing the little finger to pass. There were diffuse peritonitis and serous exudation in the left pleural cavity. The seat of the ulcer in this case corresponded to the common location of those giving rise to subphrenic abscess, although ulcers of the greater curvature may result in the same condition, as is proven by Maydl's cases; but, as a rule, these abscesses do not come in contact with the diaphragm.

In subphrenic abscess from perityphlitis, and especially from perforation of the vermiform appendix, the pus either creeps along behind the meso-cæcum in the cellular tissue, which is continuous with the perinephritic and subphrenic cellular tissue, as has been shown by the injection-experiments of Koenig and Sänger; or the veins of the appendix and cæcum, becoming the seat of purulent inflammation, establish a pylephlebitis, with abscess of the liver, as pointed out by Bierhoff.

The following case is mentioned: A man, aged thirty-eight years, suffered for years with chronic obstipation. He was taken suddenly with severe abdominal pains and fever. Some weeks later jaundice appeared, and pains in the region of the liver were complained of. Thrombosis of the right femoral vein appeared. On admission to the hospital, five months after the beginning of the disease, the patient was very thin and weak, skin jaundiced, abdomen moderately distended, and the right leg was very much swollen. From the crest of the ilium to the liver a resistant mass was noted, which was dull on percussion. The lower border of the liver reached below the costal

margin about three fingers' breadth. The pleural cavities were free. Death ten hours after admission. At the section there was found an abscess adherent to the cæcum. The appendix was behind the cæcum in the abscess-cavity, and the end was gangrenous. The abscess was retrocæcal and extended up behind the kidney and liver and filled the right subphrenic space.

A case is also described showing the development of this kind of an abscess through the portal circulation. At the *sectio mortis* there was an appendix-abscess. The veins of the mesentery were filled with thrombi; the liver contained numerous abscesses.

Subphrenic abscess from subcutaneous trauma is apt to follow insignificant injuries. According to Maydl, there is as a result of the trauma an effusion of fluid, which becomes infected. A case is described in which such an abscess followed the lifting of a heavy weight. A sharp pain was felt at once; later, fever, cough, and expectoration appeared, and there was dulness of the left lower segment of the thorax.

The next group described includes those which originate in infection of the Fallopian tubes in women, especially when following childbirth. In these cases abscess of the liver is always an intermediate stage between the pelvic disease and the subphrenic abscess. A case is given illustrating this variety of the affection.

In the cases described gas-formation in the abscess had not taken place, so that the valuable diagnostic sign of the gas mentioned by Leyden in cases of subphrenic pyopneumothorax was not present. In three cases there was serous pleurisy, and in one case empyema, which, through perforation of the diaphragm, had caused the subphrenic abscess. The presence of the serous pleurisy is of advantage from a diagnostic standpoint. If by exploratory puncture in a higher intercostal space clear fluid is withdrawn, and if pus is found at a puncture lower down, it is reasonable to infer that there are two collections of fluid, separated by a diaphragm. This may, however, lead to an error, because in a purulent fluid the pus-corpuscles may settle, or there may be a serous collection around an encapsulated empyema. There is, therefore, no absolutely sure sign of subphrenic abscess. The only rational treatment is operation as soon as the diagnosis is made.

On the Localization of Gall-stones and the Several Operations for their Removal from the Biliary Passages.

Lloyd contributed an interesting article on this subject to the *Birmingham Medical Review*, vol. xxxvii., No. 200. It is pointed out that the general diagnosis of gall-stones is insufficient to indicate the appropriate treatment in any given case, and the object of the present paper is to direct attention to the importance of determining in what anatomical region the stones probably lie. Gall-stones may prove fatal from any one of the following causes: Exhaustion, cholæmia, collapse during an attack of colic, peritonitis, pylephlebitis, hepatic abscess, intestinal obstruction, and cancer. The author thinks cholelithiasis is one of the most frequently overlooked of all disorders. Biliary colic is apt to be mistaken for biliousness, wind, cramp, spasm, congestion of the liver, indigestion, cardialgia, lead-colic, renal colic, fecal impac-

tion, pleurodynia, neuralgia, and, when severe, for pleurisy, perihepatitis, peritonitis, appendicitis, intermittent fever, and intestinal obstruction.

The general symptoms of gall-stones include paroxysmal, irregular *pains* in the abdomen, starting either in the right hypochondriac or epigastric region and radiating upward to the shoulder-tip or back to the scapular region. There may be nausea and vomiting. *Jaundice* is not an essential symptom, and may or may not be present. The same may be said of the presence of a tumor. *Pyrexia* is met with if an inflammatory process be present, and if intermittent is a symptom of the greatest value in locating the seat of the concretion. *Localized tenderness* is a valuable sign, and should be carefully studied. *Stabbing-pain* elicited by sharp, deep, heavy percussion over the right hypochondrium is suggestive of calculus. In order to locate the gall-stones the cases are divided into two groups: those in which the walls of the gall-bladder are yielding and allow of its distention, and those in which the walls are contracted, indurated, and indistensible. In the first group the stones may lie (1) in the gall-bladder, (2) in the cystic duct, or (3) in the common duct; and in the second group (4) the stone lies in the shrunken gall-bladder or cystic duct, (5) in the common duct, which with the hepatic duct is thickened and dilated, whilst the gall-bladder and its duct are shrunken and indurated, and (6) the shrunken gall-bladder is packed with stones, and a calculus is present also in the common duct.

In the first condition there may be no symptoms except attacks of colic. If, however, a stone passes along the bile-ducts to the duodenum there may be a mild jaundice on the following day, and the gall-bladder may become moderately distended. In 2 there are a distended gall-bladder and attacks of colic. There is no jaundice. In 3 there are tumor, colic, jaundice, and sometimes pyrexia. This condition must be distinguished from malignant disease of the liver or pancreas, which causes chronic jaundice and distention of the gall-bladder, but is unattended with fever. The fourth condition may be suspected in cases with frequently recurring paroxysms of pain with pyrexia and local tenderness. The recognition of No. 5, one of the most interesting and important, has been made possible by the observations of Osler, who describes the following three symptoms: Paroxysmal hepatic colic, well-marked ague-like attacks, characterized by chill, sweating, and fever, and chronic jaundice of varying intensity, deepening after each paroxysm and fading in the intervals. No. 6 has symptoms like No. 5, and can be recognized only at the time of operation.

The operations which the author prefers in the different conditions are the following: 1. Cholecystotomy. 2. Cholecystotomy, supplemented, if necessary, by cholelithotrity or choledochotomy. 3. The same as No. 2, although cholecystotomy is less apt to succeed here. 4. Choledochotomy or cholecystotomy, without suture. 5 and 6. Choledochotomy or cholelithotrity, preference being given to the former. In 6 separate incisions would have to be made in the gall-bladder and the common duct.

The Results of Double Castration in Hypertrophy of the Prostate.

Dr. J. William White has collected the evidence which is now before the profession relative to the operation which he proposed at the meeting of

the American Surgical Association, June 1, 1893, in a paper with the above title, read before the same Society, May 28, 1895, and before the American Genito-urinary Association, May 29, 1895 (*Annals of Surgery*, 1895, vol. xxii. No. 1).

The large number of cases already subjected to this operation, and the discussions that have appeared in the medical journals, render at this time at least provisional conclusions justifiable. The present *résumé* is especially interesting, as it presents for the first time a collection of cases and conclusions drawn from them.

The paper is divided into three portions: a theoretical, a clinical, and an experimental.

In the first part the author advances a theory in explanation of the etiology of hypertrophy of the prostate which he considers reasonable, although it is not at present susceptible of demonstration, but which would account for the beneficial results that follow the operation, as well as some of the clinical features of these growths. Dr. White says: "The close relationship between the testicles and the accessory sexual glands—the prostate, Cowper's glands, and the seminal vesicles—naturally leads to speculation as to a possible connection of the overgrowth with the testicular changes coming on with advancing years. In addition to the function of producing spermatozoa, the testicles determine the development of the attributes of masculinity. When full adult life is reached this controlling influence probably ceases." From this the author concludes that "the disappearance of the necessity for a given product, without the coincident disappearance of the vital energy which was expended in producing it, might conceivably result in hypertrophy of organs intimately associated with those which were the source of supply."

The second part of the paper contains a review of the clinical evidence existing at the time the paper was written. One hundred and eleven cases, reported by sixty observers, are tabulated. Three cases, operated on by as many surgeons in different cities, are described in detail. Each of these was seen by several competent physicians, so that the reports cannot be questioned. These reports show the results of castration in appropriate cases, and also afford conclusive answers to the points that have been in dispute.

Of 102 cases contained in the table in which the condition of the prostate was noted before and after operation, 65, or 63.7 per cent., are reported as showing some distinct decrease in size, while in 24 additional cases, 89 in all (87 per cent.), the improvement in other symptoms renders the conclusion justifiable that the prostate had become smaller. As will be seen by referring to the table, in most instances the shrinking of the prostate was both rapid and very marked, amounting in many cases to its practical disappearance. In two cases, in which autopsies have been made, microscopic examination of the prostate showed unmistakable evidences of atrophy, first of the glandular elements and then of the stroma, identical with the changes Dr. White described in his paper in 1893 as occurring in dogs.

In most of the tabulated cases the usual palliative measures are either stated to have been carried out, or such is implied. In many these have been most intelligently and faithfully persevered in for a long period and until the inability of such measures to afford relief had been demonstrated. That the beneficial results do not depend upon relief of congestion and

œdema which follows rest in bed, as has been claimed, is shown by the failure of this very measure in some of the cases here reported, as well as by the evidence of actual atrophy of the prostate, as seen microscopically.

The doubt expressed regarding the disappearance of the hyperplasia and the lack of accuracy in describing the size of the prostate, which the critics of the operation have complained of, have been robbed of their force, now that so many careful observers have placed themselves on record. It is impossible that all of them could have been mistaken.

In regard to the time of reporting the cases here recorded, over 71 per cent. were observed more than three months after the operation; in these "the local changes seem to have reached their culmination, and the health of the patients appeared to be permanently re-established."

The author believes that castration is to be preferred to suprapubic prostatectomy, which has been the operation of choice in advanced cases of prostatic hypertrophy for the following reasons: it has a lower mortality, the return to local and general health has been more complete and vastly more rapid than after prostatectomy, vesical contractility has been re-established, and pain and cystitis have disappeared, and the annoyance of a permanent fistula is avoided.

A number of observations, clinical and experimental, are recorded on *unilateral castration, ligation and section of the vas*, and *ligation of the vascular structures of the cord*. An effort was made to determine the respective merits of each, and their value, compared with castration, but the material was too limited to permit of definite conclusions.

The paper concludes with the following summary:

1. The function of the testis, like that of the ovary, is twofold—the reproduction of the species, and the development and preservation of the secondary sexual characteristics of the individual. The need for the exercise of the latter function ceases when full adult life is reached, but it is possible that the activity of the testis and ovary in this respect does not disappear coincidently, and that hypertrophies in closely allied organs, like the prostate and uterus, are the result of this misdirected energy. This hypothesis would increase the analogy between the fibromyomata of the uterus and the adenofibromata of the prostate, which, from a clinical standpoint, is already very striking, and is further strengthened by the almost identical results of castration in the two conditions.

2. The theoretical objections which have been urged against the operation of double castration have been fully negatived by clinical experience, which shows that in a very large proportion of cases (thus far in approximately 87.2 per cent.), rapid atrophy of the prostatic enlargement follows the operation; and that disappearance or great lessening in degree of long-standing cystitis (52 per cent.); more or less return of vesical contractility (66 per cent.); amelioration of the most troublesome symptoms (83 per cent.); and a return to local conditions not very far removed from normal (46.4 per cent.), may be expected in a considerable number of cases.

3. The deaths have been 20 in 111 cases, a percentage of 18. But of these there seem to be 13 that may fairly be excluded in an attempt to ascertain the legitimate mortality in patients operated upon under surgically favorable conditions—*i. e.*, before the actual onset of uræmia, or, better, before the

kidneys have become disorganized by the two factors rarely absent in advanced cases—backward pressure and infection. This would leave a mortality of 7.1 per cent., which will probably be decreased as advancing knowledge permits of a better selection of cases. It is important to note that even in the desperate cases which make up this series of deaths, 15 (75 per cent.) showed improvement of symptoms or shrinkage of the prostate before they died.

4. Comparison with other operative procedures seems to justify the statement that, apart from the sentimental objections of aged persons on the one hand, and the real, entirely natural, and very strong repugnance to the operation felt by younger patients, castration offers a better prospect of permanent return to nearly normal conditions than does any other method of treatment. The relatively greater degree of improvement in successful cases should be considered, as well as the mortality, in comparing the operation with the various forms of prostatotomy and prostatectomy. So, too, should the absence of any risk of permanent fistulæ, peritoneal or supra-pubic, the ease and quickness with which the operation can be performed, and the possibility of avoiding altogether the use of anæsthetics, which, in these cases, are in themselves dangerous.

5. The evidence as to unilateral castration is at present contradictory, but there can be no doubt that in some cases it is followed by unilateral atrophy of the prostate, and in two cases, at least, it has resulted in a very marked improvement of symptoms. It is worthy of further investigation.

6. My experiments on dogs have shown in nearly every case in which the vas deferens was tied or divided on both sides, that, without much change in the testicles, there were beginning atrophy and considerable loss of weight of the prostate. These experiments need repetition and confirmation, as the absence of corresponding testicular change seems to make the results somewhat anomalous. It is possible that the inclusion or severance of small but important nerves may account for the effect on the prostate.

7. Ligation of the vascular constituents of the cord, or of the whole cord, produces atrophy of the prostate, but in my experiments only after first causing disorganization of the testis.

Two Cases of Appendicitis Associated with Rheumatism.

Brazil (*Brit. Med. Journ.*, May 25, 1895) reports two interesting cases of appendicitis associated with symptoms of rheumatism. In the first patient there were pain and tenderness at and around McBurney's point; he had vomited several times, the temperature was slightly over 102°, and there was double tonsillitis. In the next few days he complained of pain in the right shoulder joint, and profuse perspiration. He was then given 15 grains of salicylate of sodium every four hours. On the following day pain and tenderness had almost disappeared, and by the next day, the seventh from the commencement, he was practically convalescent.

The second case, a girl aged twelve years, had pain in the right iliac fossa, and vomiting, followed by pain in the left shoulder joint and along the spine. She had pain and tenderness at McBurney's point, extending downward toward Poupart's ligament. The temperature was 101.2°, pulse 120,

urine loaded with urates. Salicylate of sodium (gr. xv.) with tincture of opium (mx.) every four hours, reduced the temperature and pulse, and relieved the pain, so that on the following day she was convalescent.

The author makes the following remarks: The occasional association of the symptoms of typhlitis or appendicitis with those of rheumatism appears only to have been noticed quite recently. Haig published the first case in 1893, and others have since been mentioned. Recent researches have shown that cases which used formerly to be termed typhlitis and perityphlitis are almost invariably appendicitis in reality, and we shall probably not greatly err in regarding all the cases here alluded to as belonging to that category. Whether the symptoms of appendicitis were really of rheumatic origin or not is a question on which we cannot dogmatize as yet. The author ventures, however, to think, that there is already some clinical evidence pointing to that conclusion, and the remarkable similarity of structure between the vermiform appendix and the tonsil, together with the well-known liability of the latter organ to rheumatic inflammation, would lend support to the view.

Case of a Tumor of the Dura Mater Pressing on the Brain Successfully Removed by Operation.

Syme (*Australian Med. Journ.*, February 20, 1895) reported the following interesting case to the Medical Society of Victoria.

A male patient, thirty years of age, awoke two hours after retiring with a peculiar sense of constriction about the throat, a numb feeling in his tongue and the right side of his face, and with a general feeling of oppression below his left ribs. It was observed that the right side of his face twitched, his right arm and leg were drawn up, and then spasmodically jerked, and then his whole body convulsed. The attack lasted about twenty minutes. The next day he felt confused and had some difficulty in speaking distinctly, his tongue felt awkward, and his face was drawn to the left side. On examination he had distinct and complete paralysis of the right side of the face and tongue. His speech was a little thick. There was no loss of sensation in face or limbs, and no paralysis of any other part of the body. His hearing was perfect, and he could write.

From the distinctness of the limitation of the premonitory symptoms to the face, tongue, and throat, the commencement of the spasms in the face and tongue, and the persistence of the paralysis afterward in these parts, it was concluded that he had some irritation of the cerebral cortex over the face and tongue centres in the lower part of the left ascending frontal convolutions, and that the irritation was probably due to a tumor.

About a month later he had another fit, and he continued to have attacks of epileptic convulsions at intervals varying from five to three weeks, exactly the same as the first, except that he did not always lose consciousness. His tongue was always bitten. He never passed urine or feces in the attacks. The facial paralysis lasted for several days after the fit, and gradually improved till the next attack.

When next seen, eighteen months later, he was then completely aphasic, and was also unable to write; he was able to write the letters, but could not

put them together to form intelligible words. There was, in addition to his previous symptoms, distinct paresis of the right hand, and he complained of pain in the left parietal region, which he said had been present for some months. The fits had increased in frequency and severity, and had latterly been always followed by loss of speech, which gradually passed off.

On removing a disk of bone over the centre for the face and tongue, a tumor was discovered bulging out the dura mater. The bone wound was increased as the tumor was found to extend further forward and upward toward the second frontal convolution. The tumor was found to be adherent to the dura mater, part of which had to be removed, and from which it appeared to have grown. It was encapsulated and was quite easily separable and distinct from the brain substance, and left a cavity corresponding to the lower part of the ascending frontal and posterior part of the second and third frontal convolutions. The tumor weighed two and one-half ounces. Hemorrhage was free during the whole period of operation. The cavity was well washed out with hot sublimate lotion (1 : 2000), and packed with iodoform-gauze, and the major part of the wound closed by suturing with horse-hair, a small part being left open for drainage. The dura mater was not sutured or the bone replaced; an antiseptic dressing was applied.

The temperature never rose above 100.6° F., and kept for the most part about the normal line. The day following operation the iodoform-gauze was removed, as there had been but little oozing. The wound was dressed daily for the next three days, when the brain commenced to protrude slightly through the unsutured part. A pad of sublimate-gauze was placed over the protruding tissue, and two days later the unsutured parts were brought together and sutured. Pressure was again applied, and no further hernia occurred.

The recovery was rapid from the operation, but slow from the paralyses. He was discharged five weeks after operation. There was a depression in the region of the scar. Four months after operation the paresis of face and tongue is very slight. His speech is good. He writes well. He has no pain, has had no fits, and feels able to resume work. The tumor was a round-celled sarcoma arising from the connective tissue of the dura mater.

The Education of the Vicarious Functions in those in whom Amputation has been Performed and in the Paralytic.

Gluck (*La Méd. Mod.*, May 15, 1895) calls attention to the necessity of teaching those who have suffered amputation of a limb the use of the artificial member which has replaced it. He presented a number of patients before the Medical Society of Berlin in illustration of the methods he employed. In the first case the patient was twenty years of age, and had had a paralysis since infancy of all four limbs, with contraction of the flexors of the elbow and wrist, and of the knee and hip of left side. The patient could not move without great effort, and the muscles were greatly hypertrophied. The contractions were overcome by sectioning of the *fascia lata*, and all the soft parts about the elbow-joint and hand. The muscles of both the right hand and right thigh recovered their power through appropriate exercise. The result was very good. The patient walked very well with the use of an

apparatus, and could use the muscles of the right hand sufficiently to earn her living by writing.

In the second case, a child who had lost the left leg danced and jumped on the right.

In the third case, an infantile paralysis of the lower extremities in a boy, the patient had no use of the lower limbs, but could walk and jump on his hands.

Tuberculosis of the Mammæ.

Recnick (*Beiträge zur klin. Chir.*, Bd. xiii. Heft 1) believes that the diagnosis of this disease can only be based upon the histological examination and the observation of the very few tuberculous bacilli that are present. There are three modes possible through which infection may come: (1) Direct infection from without, which is improbable in most cases; (2) extension by contiguity, probably the most common method, although the cases which are under consideration do not probably belong to this form.

(3) Primary tuberculosis of the mammæ, the author believes, in which infection of the neighboring tissues is excluded, can only occur in the third mode, the hæmatogenic.

As to treatment the author recommends in circumscribed disease, where the diagnosis has been established, an attempt at partial extirpation; in more advanced cases total extirpation and removal of the axillary glands.

OTOLOGY.

UNDER THE CHARGE OF

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Eczema of the External Auditory Canal.

Hermet (*Journal de Médecine de Paris*, January 27, 1895) presents the causes and symptoms of this disease very graphically: But the treatment of acute eczema of the auditory canal with strong solutions of nitrate of silver we have found valueless. In fact, nothing equals in efficiency in this malady black wash, *ad libitum*, by instillation, in the burning, painful stage of acute eczema of the auditory canal.

The Ear in Tabes.

Those affected with bulbar tabes may exhibit cutaneous ulcerations of the face, nose, and auricles, the symmetrical distribution of which demonstrates its trophic origin. The lesion of the middle ear in tabes is sclerosis of the inner wall of the drum-cavity and the inner surface of the membrana tympani. This may arise from the changes in the trophic nerve of the cavity, coming from the fifth nerve, which is affected centrally. The sensory and

trophic changes in the skin of the auricle and face in tabetics mentioned above lend support to this hypothesis. This sclerosis, as well as the lesion of the fifth nerve and the tabes itself, may all be parasyphilitic results.—F. J. COLLET: *La Presse Médicale*, January 12, 1895.

THE BAD RESULTS OF PIERCING THE LOBULE OF THE AURICLE.

FOURNIER reports, among other infections of the lobules of the ear from jewellers piercing it for ear-rings, several cases of lupus, syphilis, and tubercle.—*Journal de Maladies cutan. et syphilitiques*, vol. vi., p. 321.

INCIPIENT INFLAMMATIONS OF THE EAR IN EARLY LIFE AND THEIR SEQUELÆ.

The probability that a physiological condition of the newborn child's ear will pass into a pathological state seems to be exaggerated by some writers (S. MACCUEN SMITH, M.D., *New York Medical Journal*, vol. lx.). If the ear of a newborn child is *let alone*, no inflammation will occur in it from retained natural secretions, as the ear possesses the power to relieve itself of them by the outward growth of the skin lining the auditory canal.

The newborn child is often the victim of too much washing and swabbing of the meatus on the part of oversensitive mothers and oversedulous nurses. It is not uncommon to find infants a few weeks old suffering from a discharge from both ears thus set up. But the true cause of the disease is generally denied by the nurses, though sometimes admitted by the mothers.

TRAUMATIC MYRINGITIS.

The evils of ignorant and unskilful manipulations of the external auditory canal and membrana are shown in a case applying for relief from ear pain at Prof. Seiss's clinic in the Philadelphia Polyclinic. A general practitioner had roughly probed a perfectly well ear for reasons unknown, with the result of wounding the fundus of the canal and setting up a profound dermatitis at this point.—W. HENRY FRITTS, M.D.: *Philadelphia Polyclinic*, January 19, 1895.

TRAUMATIC RUPTURE OF THE MEMBRANA TYMPANI.

Attention is again called to the fact that the membrana tympani is often injured, in cases of fracture of the skull involving the petrous portion of the temporal bone, by blows on the chin and by a "box on the ear." Such accidents may or may not be accompanied by hemorrhage from the auditory meatus. Of course it follows from the nature of some of the injuries named above that hemorrhage from the meatus auditorius is not necessarily a grave symptom.—J. LINN THOMAS, F.R.C.S., Eng.: *British Medical Journal*, November 3, 1894.

FOREIGN BODIES IN THE EAR.

In regard to foreign bodies in the ear much might be said if space permitted. The first and important injunction is: be sure there is a foreign

body in the ear before endeavors are made to extract it. Much damage has been done to the ear by the general practitioner groping after a foreign substance said to be in the ear, which was not there and never had been. In no case should anyone not a specialist use any form of surgical instrument to extract a foreign body from the ear. If a living insect has entered the ear a few drops of sweet-oil will smother it, and it may then be syringed out with warm water. If an inanimate substance has been placed in the ear, as is often done in play by children to their own ears, syringing with warm water will generally remove it, if the ear has not been previously wounded by probes or forceps. If the latter has been done the child should be etherized and the foreign body removed by an expert. There is no hurry demanded in such cases. The foreign substance had better be left in the ear indefinitely than to apply rough measures for its removal. What a child can slip into the ear in play can be easily removed if the physician first called knows how to do it. Unless he knows what to do and what not to do, he had better not touch the case. It will be better to send the patient to the nearest aurist than to do the wrong thing for relief. Death has occurred by the unskilful endeavors of the general practitioner to remove a foreign body from the ear of a child. Not the foreign body in the ear, but the improper treatment is the cause of death in such cases.—ROBERT BARCLAY, M.D.: *Polyclinic*, Philadelphia, October 13, 1894. We consider the instillation of oil into the ear, for the removal of foreign matters from it, as recommended by Ziem, of Dantzic, as futile.

BACTERIOLOGICAL INVESTIGATION OF THE SUPPURATIVE EAR DISCHARGES OCCURRING IN SCARLET FEVER.

FRANK R. BLAXALL, M.D. Lond., has made an exhaustive study of the above-named subject, and his conclusions, similar to those of Gradenigo and Pes (see this JOURNAL for July, 1895, p. 104), are as follows: 1. That the organism most potent in the etiology of the otitis media of scarlatina is the streptococcus pyogenes. 2. The less chance there is of *contamination from the outer air, through the external ear*, the more the pyogenic cocci predominate over the rod-forms, but that prior to perforation of the membrana tympani the occurrence of such organism is not precluded, since they may ascend from the mouth and air-passages. 3. Next to the streptococcus the most important organisms are the staphylococci albus and aureus. 4. Apparently the diplococcus pneumoniæ of Fraenkel or the bacillus pneumoniæ of Friedländer do not play such an important part in otitis media of scarlet fever as in the otitis media acuta due to other causes.—*British Medical Journal*, July 21, 1894.

THE CARE OF THE EAR DURING THE EXANTHEMATA.

MR. WALKER DOWNIE, of Glasgow, in an article on this subject (*British Medical Journal*, November 24, 1894), first showed that tympanic involvement was due in 26.1 per cent. of cases to measles, in 12.6 per cent. to scarlet fever, in 29.4 per cent. to a catarrhal origin, and in 20 per cent. to the eruption of teeth (in children under twelve years of age). The otitis media in them is due, not so much to direct extension of inflammation from throat and nose,

by the Eustachian tube, to the middle ear, as by the sealing or plugging of the mouth of the Eustachian tube by the retained mucus in the naso-pharynx, the damming then of mucus in the ear, with consequent distention, extravasation, and pain in the ear, all favored by the recumbent position. Therefore the treatment should consist, first, in vigorous blowing and cleansing of the nose, if possible, and gentle Politzer inflation, *chiefly for dislodging mucus plugs from the naso-pharynx*, and, if these methods give no relief to pain and deafness, to paracentesis of the membrana. Blisters, leeching, application of Leiter's coil, and the like to relieve earache, he regarded (very justly) as an "evidence of ignorance of the conditions under consideration," and as loss of valuable time.

Dr. Wendell C. Phillips, of New York, writes in the same way of the ear in the course of the exanthemata, recommending great caution in the use of any form of inflation of the tympana in such cases, lest septic matter be forced into the middle ear.—*American Medical and Surgical Bulletin*, New York, March 15, 1895.

We regret to be obliged to condemn the method of evacuation of the tympanum by alternate condensation and rarefaction of the nares and naso-pharynx, by means of a bulb-syringe, recommended by Mr. Donald B. Fraser, of London, Ontario.—*Medical News*, Philadelphia, April 27 and May 18, 1895. Such a method of treatment of inflamed nares and naso-pharynx would surely force septic matter into both tympana and dry-cup these naso-pharyngo-Eustachian regions, resulting in extravasation and rupture in the delicate mucous lining of these structures.

The "stopped-up" feeling in the ear, in the early stages of a coryza, is shown by Dr. B. Alexander Randall to be due, not to secretions in the tympanum, but to a vacuum in the drum-cavity by the unconscious performance by the patient of the "negative" Valsavan or Toynbee exhaustion of the air in this cavity. He shows that cocaine, though relieving the condition at first, is followed by obstinate secondary relaxation, requiring gentle alkaline spraying, followed by an oily spray, like glycoline or fluid petrolatum, in which menthol and camphor, of each one grain, are dissolved, and then, according to his experience, light insufflations or dusting of the affected parts with calomel. But no inflations of the naso-pharynx and middle ears are recommended in this condition by this sagacious writer. —*Polyclinic*, Philadelphia, May 4, 1895.

Aural Inhibitions.

Gellé maintains that aural inhibitions are frequent and easily produced in neurasthenics and hystericals, and such subjects he terms "inhibitropes." —*Annales des Maladies de l'Oreille*, vol. xx.

Audition may be inhibited by concentrated attention, preoccupation, and functional activity of other viscera, as during digestion and pregnancy. Clinical observation shows also that the hearing is altered in ulceration of the larynx and of the isthmus of the pharynx (which latter also causes earache), and in dental caries, etc.

Inhibitions originating in aural irritation are frequent and intense. Thus a foreign body, as a cerumen-plug, and the introduction of the ear-funnel may cause sudden aphonia, spasmodic cough, and difficult deglutition.

Everything causing compression of the labyrinth or any abnormal tension of the auditory apparatus predisposes to central incapacity and dulled intelligence. Acute and chronic otitis are often attended with defective vision. Vasomotor activity is influenced markedly by affections of the labyrinth, pressure on the stapes causing injection of the conjunctiva. In sclerotic otitis, disturbances in the capillary circulation of auricle and face are sometimes very marked. In a case of multiple recrudescent polypi in the ear, after extraction, Gellé observed a double exophthalmos develop without alteration in the pulse or thyroid body. Dryness of the fauces and of the skin of the auditory canal has long been noted as secretory inhibitions in sclerotic otitis media. Affections in the mucous membrane of the Eustachian tube cause paresis of the adjacent palatine muscles and consequent autophony and aphonia. Otitis may affect the chorda tympani, resulting in dryness of the corresponding side of the tongue and in impaired taste. Paresis of the sterno-cleido-mastoid and torticollis may appear on the side of the diseased ear.

Most remarkable of all is the inhibition of one ear by the other. Thus a concussion of the labyrinth on one side may be followed by great impairment on the uninjured side by inhibitory action of the affected ear.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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BLINDNESS AFTER HEAD INJURIES.

E. NETTLESHIP, of London (*Ophthalmic Review*, vol. xiv., No. 162), reports three cases of amaurosis after injury to the head. In the first there was a fracture of the base in early childhood, followed by total loss of sight in both eyes, coming on two hours after the accident. For about a fortnight blindness remained complete, then there was gradual recovery until six weeks from the accident. Vision was 6/24 and 6/6. In the second case, of a woman aged fifty years, vision failed about two days after the injury, until unable to count fingers with the right eye. There was hemorrhage from the nose at six days after injury. After twelve days vision improved rapidly, and became "very good" within four weeks. In the third case, of a man aged thirty years, the blindness of the left eye was absolute, and the disk became pale, with slight haziness of the retina and cherry-red spot at the macula.

In these cases the blindness is almost always permanent, and the disk

comes to show atrophic changes. In the rare cases, where recovery of sight takes place, it seems most probable that the damage has been due to effusion of blood into the sheath space of the optic nerve rather than to injury of the nerve itself. That such distention may occur has been shown by a case reported by Priestley Smith. Nettleship suggests that the appearances in the third case, like those seen in embolism, might be explained by persistent compression of the nerve and the central vessels by a large clot in the sheath.

The Best Method of Treating Hernia of the Iris.

Grandclément, of Lyons (*La Médicine Moderne*, 6 ann., No. 38) finds that any hernia of the iris left to itself constitutes a permanent menace to the eye and vision either by staphyloma or infection. It should be met by surgical intervention. Reduction, either spontaneous or by the use of eserine or atropine, is exceptional and rare. Of the three operative methods he finds excision offers risk and difficulty; cauterization is painful and often inefficient; but incision, properly done, gives certain and rapid results. The incision should boldly divide the hernial protrusion into equal parts in the direction of its greatest diameter.

Iridectomy for Glaucoma.

A. M. Ramsay (*Glasgow Med. Journ.*, vol. xliii., No. 4) finds myotics and systemic remedies are merely tentative, and the long natural history of a case of chronic glaucoma prevents one from estimating how much they really prolong the course of the disease. No case was ever cured by their means alone. The only cure is an iridectomy performed at the proper time and satisfying the following requirements:

(1) The incision ought to be large and wholly in the sclera, about 1 mm. behind the corneal margin. The knife may be either a keratome or a linear section knife. A keen edge is more important than the shape.

(2) The aqueous ought to be allowed to drain off slowly.

(3) The loop of iris to be excised should be carefully pulled out of the wound, snipped on one side, then torn away from its ciliary attachment along the whole length of the wound, and afterward cut off by another snip. If a corneal incision be made, and the iris drawn out and cut off by one snip of the scissors, more harm may be done than good. The iris bleeds freely, and is always very sensitive, so that if chloroform has not been administered, this stage of the operation is very painful.

(4) The corners of the cut iris must be very carefully replaced, in order that, if possible, no tags may become adherent to the wound.

The operation ought to be performed as soon as possible after the diagnosis of glaucoma is clearly established, and, although this remark applies principally to the inflammatory forms of the disease, it also holds true of the simple non-inflammatory.

Amblyopia from the Use of Acetanilid.

R. Hilbert, of Sensburg, reports (*Memorabilien*, xxxix. Jahrg., 2 Heft.) a case of severe temporary blindness from the use of this drug. The patient,

a well-built man of thirty-six years, after a night of dissipation, awoke late in the morning with a severe headache, for which he took one gramme of "antifebrin." This dose not having the desired effect, he took within a half hour two more grammes, when suddenly with the relief of the headache alarming symptoms developed. There were vertigo, a disagreeable rushing noise in the ears, the subjective olfactory disturbances of this drug, and vision in both eyes sank rapidly to a minimum, so that he could not find his way about his room.

When seen, about noon, his face was noticeably pale, the forehead covered with cold sweat. The pupils were of medium size and did not react to light. He could barely recognize the movements of the hand at one-half metre, and this only near the centre of the visual field. With the ophthalmoscope the optic disk appeared pale, the retinal vessels diminished. The pulse was 64 to the minute, the heart sounds clear, the urine free from albumin and sugar.

He was given brandy internally and inhalations of amyl nitrite. Five minutes after the first inhalation there was improvement of vision with the reddening of the face and quickening of the pulse. The inhalations were continued for two hours, and an injection of strychnine given. By 8 P. M. vision had risen to 6/12, and there was no apparent limitation of the visual field. At one o'clock the next afternoon vision was normal in both eyes, the pupils were of the usual size, with prompt light reaction, and there remained no pathological appearance in the fundus.

Hilbert points out that amblyopia from acetanilid, like other toxic amblyopias, appears to depend on anæmia of the retina, and perhaps of the visual centres.

Carcinoma of the Conjunctival Limbus in a Child.

Rogman (Ghent) reports (*Annal. d'Oculist*, vol. cxiii., No. 3) a case occurring in boy of fourteen years, the youngest of five children, all healthy. The tumor was of a yellowish-white color, 3 mm. wide, 4 mm. long, its greatest diameter being parallel to the limbus, and 1 or 2 mm. thick. Its surface was slightly nodulated, but not ulcerated. It had been noticed first about a month and a half previously. It was removed with a bistoury and the surface of implantation energetically curretted. More than a year afterward the eye remained normal, except a slight spot of venous tint from thinning of the sclera. The anatomical (microscopical) diagnosis of commencing epithelial carcinoma of the conjunctival limbus was unquestionable.

Outflow Channels of the Eye and Artificial Glaucoma.

M. Knies (Freiburg) years ago, by introducing non-irritant substances into the eye-ball, demonstrated the course of the intra-ocular currents and the outflow through Fontana's space. He now reports (*Arch. of Ophthalmol.*, vol. xxiv., No. 2) the results of a series of experiments made to render visible the channels of outflow from the eye (especially those of the anterior chamber) by means of the inflammatory changes which aseptic agents provocative of inflammation, that had been introduced into the vitreous, would excite in the course of their passage through those channels. The substances employed were olive oil and oil of turpentine, to which was added mercurial

ointment in a part of the experiments. The results of these experiments showed that the outflow takes place mainly from the angle of the anterior chamber through the sclera to Tenon's capsule, and to a less extent through the unchanged cornea, and when these anterior channels were blocked by the inflammatory changes produced in and about them the existence was demonstrated of posterior channels of outflow with a starting point at the optic papilla, especially in its interstitial tissue.

It was hoped by exciting an adhesive inflammation in the channels of outflow to produce an artificial glaucoma; but this was only partly successful. Only a temporary occlusion with corresponding glaucomatous attack was secured. Permanent occlusion of the channels he failed to produce. But he believes that whoever can discover an inflammatory agent acting continuously but less intensely than the one he employed can do it. He suggests as of this nature the substance secreted by a growing malignant tumor.

He concludes that the theory of the neurotic origin of glaucoma should be done away with. If we call glaucoma simplex what it really is, optic nerve atrophy with excavation, and call the true forms of glaucoma irido-cyclitis anterior (*i. e.*, a form in which the exudate is found mainly on the anterior aspect of these parts), an inflammation which may occur in every possible degree of acuity and intensity, we have the designation in which the clinical symptoms and the anatomical conditions are strictly correlative, we have well-known and readily recognizable clinical pictures of diseases that have a real existence.

Diphtheritic Conjunctivitis Treated with Antitoxin Serum.

V. Morax (Paris) reports in the *Annal. d'Oculistique*, vol. cxiii., No. 4, four cases of diphtheritic conjunctivitis treated by injections of the antitoxin. The ages of the patients ranged from ten months to six and a half years. In three there was also nasal diphtheria, and in the oldest largyngeal diphtheria requiring tracheotomy and broncho-pneumonia, yet all recovered. Corneal disturbances occurred in none of the cases. Morax believes, contrary to the common opinion, that this disease is very frequently benign; but the rapidity of the recovery and the changes in the local and general condition following the injection so closely, showed conclusively the therapeutic activity of the serum. In all of these cases the bacteriological examination revealed the presence of the diphtheria bacilli, which disappeared rapidly on recovery.

In the local treatment collyria of silver nitrate were used apparently with beneficial, and certainly without harmful, effect. The use of this caustic is advised after the injection of the serum in doubtful cases where both purulent secretion and false membranes are present.

Large Probes in the Treatment of Lachrymal Obstruction.

S. Snell (of Sheffield) reports in the *Ophthalmic Review*, vol. xiv., No. 162, his experience with the use of large probes as advocated by Theobald. He employs probes ranging in size from 1.25 to 4 mm., not numbered after the usual plan, but with the size in millimetres stamped upon them. After slitting the canaliculus he does not, as a rule, begin with the smallest probe. If the 1.5 mm. will pass it is succeeded by the 2 mm. and 2.5 mm., or it may be by

the 3 mm. The next day the largest probe previously passed is again used, followed by the next size. The patient is not seen again for two days, then for three or four days, then for a week, until four or five weeks elapse. If the case is satisfactory attendance will then cease. It is rarely necessary to use the 4 mm. probe, but the 3 mm. is constantly required, and less frequently the 3.5 mm.

Snell finds his experience after sixteen years most satisfactory. The bulk of cases are cured or very much benefited. Those in which improvement does not take place are very few. His success is better than it was when employing smaller probes.

Vascularization of the Anterior Surface of the Lens.

A. Darier (Paris) records (*Ann. d'Oculistique*, vol. cxiii., No. 1) the occurrence of this in a case of chronic relapsing iridochoroiditis in a woman aged forty-two years, already past the menopause and without constitutional taint. There were posterior synechiæ and clouding of the vitreous. No lesions had been noticed in the fundus. The iris was infiltrated, thickened, œdematous, and vessels, new formations, and small hemorrhagic spots were seen on its surface. At the lower inner portion of the pupil, extending from the free border of the iris, or rather from its posterior surface, were seen four vascular branches, two arteries and two veins, very distinctly ramifying in a fine network on the anterior surface of the lens. The other eye presented posterior synechiæ, but the vitreous was clear. The inflammation was of almost two years' standing when the vessels were noticed, their appearance suggesting vascularity of the cornea. The case bore no resemblance to cases of persistent pupillary membrane. Iridectomy was done with apparently beneficial effect, and the vessels ceased to carry blood. The tension remained sub-normal.

OBSTETRICS.

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Temperature, Pulse, and Respiration during Labor and the Puerperal State.

In the *Transactions of the Obstetrical Society of London*, 1895, vol. xxxvii., No. 1, Williams and Cutler report their observations as follows: They consider the low rate of the pulse after delivery to be exaggerated in many

text-books. They found that in 11 per cent. the pulse remains stationary, while in 13 it was increased after the end of the third stage. It was found that the length of labor has influence upon the pulse, and also that chloroform made the pulse higher after delivery. In nineteen cases of post-partum bleeding the pulse rose on the average 19 beats per minute; the tension is usually above normal during labor, and, should it be below normal, there is danger of bleeding.

Respiration is slightly slower after delivery. The average temperature during the lying-in state was between 98° and 99° F. Rupture of the perineum did not influence the temperature, unless septic infection occurred.

A Successful Symphysiotomy.

Abilio di Marcarenhas, in the *Annales de Gynecologie*, 1895, vol. xliii., p. 488, reports the case of a primipara of the age of twenty-nine years, who was rhachitic, and whose pelvis measured in the external antero-posterior diameter 16 cm. The patient was admitted to the Maternity of Sainte-Barbe at Lisbon, and symphysiotomy was performed. The membranes were retained unbroken until after the pubic-joint had been opened; the child was delivered alive by forceps. The mother's recovery was complicated by slight fever and diarrhœa, which may have been caused by mercurial poisoning, as bichloride was used freely about the patient. Before she left the hospital it was found that symptoms of tubercular infection were present, accompanied by dulness at the right apex. The child survived and left the hospital in good condition.

Pregnancy Complicated by Suppuration Within the Pelvis.

Michie reports in the *Medical Press and Circular*, 1895, No. 2926, a series of interesting cases in which pus had formed during pregnancy within the pelvis.

The first case was that of a middle-aged, married woman, who was four months pregnant when she developed appendicitis, and was operated upon, a perforated appendix being removed with a concretion lying at the bottom of an abscess within the pelvis; the cavity was drained by an India-rubber tube; the patient recovered in three weeks, and went to term and bore a living child in spontaneous labor.

He also reports the case of a multipara who was seized several times before labor with peritonitis, which was worse after delivery; the abdomen was opened, and several pints of offensive pus were removed; the Fallopian tubes contained pus, and the ovaries were soft, gangrenous, and almost black; the abdomen was flushed with warm water and drained by a glass tube; the patient recovered.

He also describes the case of a primipara six months pregnant, who fell off a chair, causing pain and tenderness in the abdomen; she miscarried six days later and was attacked by peritonitis; abdominal section was performed and several pints of pus evacuated; the abdomen was drained with a glass tube, and the ovaries and tubes allowed to remain; the patient recovered and subsequently became pregnant.

The writer also reports the case of a young woman four months pregnant

in whom the uterus was retroverted, while both tubes and ovaries were diseased; they were removed by abdominal section, the patient making a good recovery. He also reports a fatal case in a multipara aged forty years, about five months pregnant; she had been kicked and abused by a drunken husband; on examination, peritonitis was present and pregnancy was observed; at operation the pelvis contained a half-pint of sero-purulent fluid, with double pyosalpinx. The abdomen was flushed with warm water and a rubber drainage-tube inserted; on the third day miscarriage occurred, followed by death on the sixth day from septic peritonitis.

He also reports an interesting case of a multigravida who was three months pregnant. On examination an ovarian cyst was diagnosticated complicating the pregnancy; labor pains came on, with fever and high pulse; delivery was impossible, as the pelvis was blocked by the tumor; accordingly, the abdomen was opened, and an adherent ovarian cyst containing fetid pus was removed from the right side. No drainage was employed. Shortly after the operation the patient's abdomen became distended, and it was necessary to insert a glass drainage-tube; improvement followed and the tube was removed, but had to be reinserted; the patient made a good recovery. She afterward presented herself for treatment, suffering from retroversion of the uterus; there was also found an enlarged and cystic ovary, which was removed by abdominal section. Upon reopening the abdomen, the adhesions which had been found at the first operation had entirely disappeared.

Puerperal Tetanus; Recovery.

Thomas reports, in the *New Orleans Medical and Surgical Journal*, June, 1895, the case of a primipara who was delivered in spontaneous labor of a healthy male child; the patient was given quinine freely, as is often done in malarious districts; on the sixteenth day after confinement the patient was seized with pain in the region of the neck and jaws; tetanus soon developed, her paroxysms became severe, and opisthotonus was present. The patient was treated by laxatives, liquid feeding, and the free use of hydrate of chloral and bromide of potassium; although she was severely ill for three weeks she finally recovered.

Congenital Ichthyosis.

An especially good account of this rare disease, with microscopic section of the skin, has recently appeared in Ballantyne's *Diseases and Deformities of the Fœtus*, Vol. II., 1895. The reported cases of this disease are fully reviewed and illustrated, and a good bibliography is appended.

In the *New York Medical Record*, July 6, 1895, Cabot reports the case of an infant, fourteen months old, brought to the Vanderbilt Clinic suffering from congenital ichthyosis. The mother was a healthy German woman who had borne healthy children previously. This child was born at seven months, the mother being four days in labor, with gushes of a watery fluid accompanied by uterine pain every half hour, with dribbling between the pains; about two gallons of fluid escaped when the membranes ruptured; upon birth the child presented a ghastly appearance, being perfectly dry, its nostrils closed, while the mouth and eyes were opened, and apparently fastened in

this position; it was necessary for the attending physician to make an incision into each nostril through which the child might breathe. The child was nursed but a short time, but had such difficulty in sucking that it was fed with a spoon; it survived several attacks of marasmus and shed the entire skin several times; reddened surfaces were left, looking at first like natural skin, but which after a few days became dry and wrinkled, and covered with scaly material. The temperature of the child was also above normal. It was treated by linseed oil internally and externally, and boric acid solution. It finally developed bronchitis and died outside the hospital, from general malnutrition. The case was of unusual interest from the length of time which the child survived its birth. Most of these children live but a few months.

Decapitation and Version in Dorso-posterior Positions.

In the *Centralblatt für Gynäkologie*, No. 20, 1895, Zweifel contributes an interesting paper upon the above subject. From his studies of decapitation as performed by Braun's blunt hook, he believes that the fulcrum for the action of the hook should be in the hand of the operator and not in the neck of the child. To bring this about he has devised a double hook which is inserted under the guidance of the left hand within the vagina. The index and middle fingers are passed behind the child's neck, while the thumb is in front; the other hand is placed upon the abdomen to fix the child's body from without, or make gentle traction upon the prolapsed arm for the same purpose. The operation is best performed under anæsthesia. The instrument is then applied, being closed when introduced and passed between the symphysis and the neck of the child, and then so turned that the point of the two hooks shall grasp the neck from above. If traction be made upon the hook and if the two handles are partially rotated, the luxation of the vertebræ at once occurs. The hooks are again brought together, and under the guidance of the fingers of the left hand the soft parts are severed in the same way. If a portion of the soft parts remain after the operation is completed, it may be necessary to insert the hooks again to sever these tissues. The body of the child is then extracted, while the head is usually removed by making traction with the index finger placed in the mouth. In cases of contracted pelves it is sometimes necessary to deliver the child by the cephalotribe.

Zweifel reports four cases in which decapitation was performed with his instrument; one of these was operated upon by an assistant, and died of hemorrhage caused by a laceration of the cervix. The operator had not carefully mapped out the neck of the child with his fingers before applying the hooks, nor had he seen that the points of the hooks were not directly against the wall of the uterus.

He also reports a fifth case of dorso-posterior position in which version could not be made and in which labor was terminated by decapitation. A case reported in 1892 by Sänger is described in which the child lay with its back posterior and in which traction was made upon the upper foot, the arm having prolapsed; the result was impaction of the fœtus and rupture of the uterus.

In making version in these cases of dorso-posterior positions Zweifel urges,

if an arm is prolapsed, that the physician should not pull upon the upper foot of the child. If the arms have not prolapsed it makes but little difference which foot be grasped. In either event traction should be made downward and backward toward the sacrum and not toward the pubic joint. If these precautions be observed Zweifel has been successful in the majority of cases of version in dorso-posterior positions.

Cæsarean Section for Labor in Kyphotic Pelvis, with Exostosis.

Ludwig (*Centralblatt für Gynäkologie*, No. 20, 1895) reports the case of a patient, twenty-eight years old, who presented herself at the clinic in labor and with a kyphotic pelvis; upon internal examination it was found that a firm, hard tumor projected over the posterior surface of the symphysis; as labor was clearly impossible Cæsarean section was performed as soon as labor began. Mother and child made a good recovery.

On the Management of the Pregnant, Parturient, and Lying-in Woman Suffering from Cardiac Disease.

Phillips, in the *Practitioner*, June, 1895, does not believe that during pregnancy the left ventricle is hypertrophied as is often taught. During pregnancy the work of the heart is greatly increased, owing to the larger quantity of blood and the resistance to the circulation caused by the enlarged uterus. During labor the greatest strain comes upon the heart, the blood pressing strongly upon the ventricular walls with the contraction of the uterus, while the right heart does not receive venous blood as usual, and, hence, the partial cyanosis which is so often observed. After the birth of the child the abdominal pressure sinks, while the right heart becomes overfilled. To obviate the disturbances caused by this change of pressure a large sand-bag may be placed upon the abdomen so soon as the presenting part passes through the vulvar orifice; the bag should be retained, for at least an hour. Several forms of cardiac disease are found during pregnancy: adhesion from pericarditis, degeneration of the heart muscle, valvular heart disease, and endocarditis grafted upon a chronic form may be present.

In the treatment of these cases, if the patient passes through pregnancy without bad symptoms, treatment should be confined to keeping the bowels open and avoiding fatigue and climbing of stairs. Compensatory disturbances may appear as early as the ninth week, although usually not until the fifth month. Albuminuria is a serious complication. These cases are best treated by arsenic, iron, and strychnia, while ether and ammonia should be given for attacks of syncope; if serous effusion with dyspnœa be present digitalis or strophanthus may be employed. Over-exertion and straining during defecation should be carefully avoided. During labor the patient will be better in a sitting posture if severe dyspnœa develops; ether and brandy must be given by injection. The patient should be delivered so soon as dilatation will permit; if dilatation is not complete, incision may be practiced; ether should be used as an anæsthetic. After the birth of the child a twelve-pound sand-bag should be laid over the fundus of the uterus to counteract the rapid fall from abdominal pressure.

The greatest danger to the mother, however, lies in the first few days of the puerperal state. Post-partum bleeding should not be prevented; but if any-

thing, a moderate loss of blood will relieve the patient. Ergot is often followed by good results. In cases of great dyspnœa and cough, nitrite of amyl should be inhaled; better results are obtained from this agent than from venesection.

Phillips reports four cases, one of aortic stenosis, two of mitral disease, while the fourth was a case of chronic mitral disease in which labor was followed by acute endocarditis with regurgitation. In one of his cases of chronic mitral disease the patient was not seriously ill until the third day after delivery, when she was suddenly attacked by profound syncope; three of his cases recovered from labor, while the fourth perished from endocarditis.

In studying the literature of the subject Phillips finds that labor should not be induced. Two-thirds of the cases which he collected perished during the puerperal state. These patients are especially liable to septic infection.

Deep Incisions of the Parturient Cervix for Rapid Delivery.

In the *American Journal of Obstetrics* for June, 1895, Edgar contributes an interesting and valuable paper upon this topic. He reports three cases in which this operation was performed for eclampsia; one of his patients died from nephritis, the other two recovered. Edgar gives a full and interesting explanation of the method of performing this operation and of the result as shown in patients whom he had examined some time after delivery. He employs blunt, angular scissors which are inserted within the cervix, and incisions made to the utero-vaginal junction; four incisions are made at right angles to each other; the result is complete dilatation, while very little hemorrhage occurs. If the incisions are carried sufficiently far the uterus does not tear while the head passes through, but if the incisions are but partially complete the uterus may tear in the line of incision. The four flaps usually made do not require suture, as it has been shown by examination that they will heal throughout the greater portion of their extent if cleanliness be maintained. Edgar adds to his paper an excellent illustration from a post-mortem specimen showing the complete dilatation which follows these incisions.

This paper furnishes the best account of this operation and its results which has yet appeared in English. Obstetricians are familiar with Dührssen's writings upon the subject and with the excellent results which he has obtained.

The Interruption of Pregnancy on Account of Mental Disease.

Valenta reports in the *Archiv für Gynäkologie*, Band xlix., Heft 1, the case of a primigravida of bad hereditary history, who became excessively hysterical when she discovered that she was in a pregnant condition; her paroxysms resembled those called clownish hysteria. She became so weakened and emaciated by the disorder that it was necessary to empty the uterus. It was interesting to observe that from the moment the membranes were ruptured and the amniotic liquid escaped there was a marked improvement in the patient's condition. The case must be considered as one of excessive nervousness in a patient whose heredity was so bad that no reason for encouragement existed as regards the prognosis of her case or the continuation of pregnancy.

GYNECOLOGY.

UNDER THE CHARGE OF

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OF NEW YORK.

Gonorrhœal Endometritis.

In the discussion on endometritis before the recent German Gynecological Society, Wertheim (*Centralblatt für Gynäkologie*, 1895, No. 26) made the following deductions with regard to gonorrhœa of the uterus. Next to the urethra the uterus is the favorite seat of gonorrhœal infection. As a rule, the uterus is directly infected, and the disease is not infrequently confined to the organ. An acute and a chronic stage of uterine gonorrhœa are admissible, though the distinction cannot be sharply drawn. In the former typical gonococci are found in large numbers, but as the purulent secretion diminishes they become less numerous and are replaced by other bacteria. In eighteen uteri removed *per vaginam* for disease of the adnexa the reporter found cocci in eight, while they were absent in six specimens where the patient gave a clear history of gonorrhœa. In uterine gonorrhœa there is nearly always present an acute interstitial endometritis, though in a few cases the process is the more chronic glandular variety. In many instances there is an inflammatory infiltration of the muscle, with hyperplasia of the vessel walls. The accompanying enlargement and sensitiveness of the uterus are due to the metritis.

The inflammatory changes in the cervical tissue are least marked in the neighborhood of the os externum. The gonococci are most easily found in the mucosa and are few in number in the deeper tissues.

In five nulliparous uteri gonococci alone were found, so that mixed or secondary infection could be absolutely excluded. The latter seems to be much more rare than in gonorrhœal salpingitis. In order to decide whether the os internum offered an obstruction to the upward extension of the gonorrhœal infection, the writer selected five cases in which the adnexa were apparently healthy, and removed bits of endometrium with the sharp curette. Microscopical examinations demonstrated the fact that in every instance the corporeal endometrium contained cocci. Hence the conclusion that the frequent statement that the os internum opposes no hindrance to the ascent of the infection is erroneous.

Exacerbations of uterine gonorrhœa are often due to the influence of menstruation, coitus, or intra-uterine treatment, which cause a change in the character of the endometrium, though in many cases there is undoubtedly fresh infection. During the puerperium there is often an invasion by the cocci of tissue previously unaffected.

Bacteriology of Endometritis.

In the same discussion (*Ibid.*) Döderlein, referring to the influence of micro-organism as an etiological factor in endometritis, states that the pres-

ence of organisms of every variety in the cavity of the puerperal uterus is of pathological importance. The terms pyogenic and sapræmic endometritis are more correct than those of catarrhal, purulent, diphtheritic, or gangrenous puerperal endometritis. The pyogenic form is most common in puerperæ, and is the origin of the virulent general infection sometimes observed. The streptococcus pyogenes is nearly always the active agent, though staphylococci, gonococci, and the bacterium coli commune may be etiological factors. The specific micro-organisms of so-called sapræmic endometritis have not yet been isolated.

Operations on the Adnexa during Pregnancy.

Delagénière (*Arch. Journ. de Chir.; Centralblatt für Gynäkologie*, 1895, No. 26) reports three successful cases of cœliotomy during pregnancy. In one the patient had an attack of peritonitis during the third month, and when this subsided an ovarian tumor was discovered on the left side, the pedicle being found to be twisted when the abdomen was opened. The cyst, which was generally, though not firmly, adherent, was removed, and the patient went on to full term and had a normal confinement.

The second patient, five months pregnant, suffered from general abdominal pain and tenderness, with tympanites and obstinate constipation. On opening the abdomen it was found that both tubes were much enlarged and contained a bloody fluid, the ovaries being nearly normal, while several coils of intestine were adherent to the uterus. The adhesions were separated, and both tubes and ovaries were removed; the patient had a normal convalescence and was delivered at the usual time, the only symptom noted being a sudden attack of abdominal pain a few hours after the delivery, attended with vomiting, which lasted only a short time, and was probably due to the separation of an adhesion. In the third case a movable dermoid cyst was removed during the fifth month without interruption of the pregnancy, which concluded normally.

The writer infers from his experience that so far from pregnancy being a contraindication to ovariotomy, it is actually an urgent indication for operative interference. The prognosis as regards the continuance of pregnancy is better if the operation is uncomplicated and it is not necessary to handle the uterus.

Total Extirpation of the Uterus *versus* Castration.

Fritsch (*Deutsche med. Wochenschrift*, 1895, No. 24) discusses this question in general, setting forth the disadvantages of removal of the adnexa alone. In the case of uterine fibroids not only may the tumor continue to grow after the latter operation, but it may undergo degenerative changes similar to those noted after torsion, that is, its blood-supply is partially or wholly cut off, and cystic or necrotic degeneration follows, while the hemorrhages may continue. Again, there is the possibility that the supposed fibroid may be a sarcomatous growth which will eventually destroy life. The number of cases in which it is necessary to extirpate the uterus, where the adnexa have been removed several years before for the relief of pain, dysmenorrhœa, and

reflex neuroses, prove the necessity of removing the organ at the time of the first operation. Inflammation around the stumps, and the resulting nerve-irritation, may give rise to the same pains as before, while menstruation continues—symptoms which may persist for years until the exudates are absorbed. Silk ligatures are responsible for not a few of these troubles.

The writer states that as the result of his experience he has for several years been of the opinion that total extirpation should be performed in all cases in which the adnexa alone were formerly removed, since he cannot otherwise promise the patient a radical cure. Wherever it is possible he removes the ovaries with the uterus, believing that in young women the climacteric symptoms are the less distressing.

The most important point to be borne in mind is the remote result of the operation, and experience has shown that this is more favorable after total extirpation than after castration. At the same time it must be admitted that extirpation seems to the patient, as well as to the physician, to be a more formidable procedure.

The writer prefers the vaginal route, even for fibroids of considerable size, but still performs cœliotomy in cases of pyosalpinx!

Vagino-fixation.

Gilbert (*St. Petersburger med. Wochenschrift*, 1895, No. 22), reporting several cases of vagino-fixation by Dührssen's method, notes the objections which have been made to the operation. To the criticism that the uterus is left in a condition of pathological anteflexion, he replies that, although this condition may seem to exist at first, the organ is subsequently found to be in normal position. This change is assisted by adopting Dührssen's suggestion of making frequent traction upon the portio, so as to throw it further backward.

Sänger has raised the objection that the vagina is too distensible to support the weight of the uterus for any length of time, and will eventually become so relaxed that the organ will remain fixed and at length become retroverted. The writer replies that this is entirely a matter of experience, and that such a result has not yet been obsevered. If the vagina is relaxed colporrhaphy should be performed.

He calls attention to the fact that the operation is not applicable to cases in which it would be necessary to separate firm and extensive adhesions before replacing the uterus; in these ventro-fixation is indicated.

Abscess of the Corpus Luteum.

Langer (*Archiv für Gynäkologie*, Band xlix., Heft 1) reports five cases of isolated abscess of the corpus luteum operated upon at the Prague clinic within a month, which he found on microscopical examination to arise from suppuration of a pre-existing corpus luteum, as shown by the presence of the characteristic cells. These are to be distinguished from abscesses that develop from a Graafian follicle or corpus luteum cyst, which are the kind usually described.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Tuberculous Meat and Milk.

In the *Report of the Royal Commission on Tuberculosis* (*The Veterinary Journal and Annals of Comparative Pathology*, June, 1895) the commissioners state explicitly that tuberculosis is the same disease in man and in the food animals, regardless of differences in its manifestations and regardless of its origin in tuberculous food or otherwise Experiments on the effects of feeding pigs, guinea-pigs, and rabbits on uncooked milk and meat from tuberculous animals proved that the disease will thus be caused in a large percentage of the subjects used. In these experiments no particular examination for actual tubercle in the food material was made, but care was taken to avoid any obvious mass of tubercle. Control experiments with animals kept under similar conditions, but receiving no tuberculous food, gave negative results. Uncooked tuberculous matter (meat from tuberculous animals, and material containing tuberculous matter recognized as such) produced the disease in 8 pigs, 5 cats, 56 out of 84 guinea-pigs, and 8 out of 10 calves that were fed with it.

Tuberculous matter in food is found principally in the organs of the animals, while in muscle and muscle-juice the bacilli are very seldom met with. But the meat may become contaminated from the actual tuberculous lesions present in other parts of the carcass, by the hands, knives, and cloths of the butcher during the processes of slaying and dressing. The greater the amount of tubercle in the animal the more the likelihood of this contamination; and since, when meat is infective it is commonly so by reason of accidental contamination with tuberculous material, it follows that more depends on the care taken in guarding against contamination than on anything else. It is further pointed out that the carcass of an animal perfectly free from tuberculosis may become infective by contact, direct or indirect, with one which is tuberculous. And, also, that a great deal of meat from tuberculous animals may be consumed with impunity if sufficient discrimination and care are exercised in slaughtering and dressing. Any part containing any tubercle whatever should be removed and destroyed, and the whole carcass in cases where the animal is found to have advanced or general tuberculosis. The condition required for causing the milk of tuberculous cows to be infective is tuberculous disease of the udder, and this may be found in mild or advanced stages of tuberculosis. No bacilli were found in the milk of 8 tuberculous cows with healthy udders, and no results were obtained from feeding 41 animals and inoculating 28 with the milk. Milk containing the bacilli taken

from 3 cows with disease of the udder produced the disease in 13 animals inoculated and 15 fed with it. That from a cow with udder disease, but showing no bacilli, caused tuberculosis in 4 of 10 animals fed with it, and in all of 6 others in which it was inoculated.

Not alone the milk from cows with udder disease, but the butter, skimmed milk, and buttermilk derived therefrom are shown to produce tuberculosis. The rapidity with which the disease of the udder may spread leads to the conclusion that no tuberculous animal of any kind should be allowed to remain in a dairy.

Ordinary cooking suffices to destroy the harmful quality of tuberculous matter, but however high the temperature may be near the surface it seldom reaches 60° C. in the centre of a joint of more than three or four pounds. In the case of milk the tuberculous matter is rendered absolutely innocuous by putting the milk over the fire and taking it off as soon as it boils.

Disinfection of Tubercle-infected Houses.

The experiments of Mr. Sheridan Delépine and Dr. Arthur Ransome (*British Medical Journal*, Feb. 16, 1895) led to the following conclusions:

The disinfection of rooms which have been contaminated with tuberculous products cannot be obtained by means of the fumigation methods, such as are generally used at present. Sulphurous acid, chlorine, and euchlorine, as used under supervision by experienced municipal disinfectors, have proved practically useless.

The only other method of disinfection which seemed to promise more satisfactory results was the direct application of a solution of chlorinated lime to the walls to be disinfected. This method has given so far satisfactory results, but is attended with discomfort on the part of those who have to carry out the disinfection.

Light is, in the case of the tubercle bacilli, as it has been proved by several observers to be in the case of other organisms, the most important natural disinfecting agent.

Simple drying was shown to be in itself enough to reduce and ultimately entirely destroy the virulence of tuberculous products. Mere ventilation in the dark suffices only to diminish and not to destroy the power of the microbe.

Prevalence of Bovine Tuberculosis.

Dr. Austin Peters (*Boston Medical and Surgical Journal*, cxxxi., p. 525) states that in Mexico bovine tuberculosis is exceedingly common, about 34 per cent. of the animals slaughtered being found affected. In England also it has long been recognized as a very common disease among animals, especially the bovine species. In this country tuberculosis is the only one of the four great bovine scourges, and during the past few years many of the States, especially in the East, have taken steps to eradicate this one. In New York in districts where the herds are made up largely of hardy grades of the Ayrshire, Holstein, and short-horn families, about 1 per cent. of the cows are tuberculous, while in districts where more cattle of the Channel Island breeds are found, between 2 and 3 per cent. are tuberculous. In Eastern Massachusetts it is much more frequent than this.

Abattoir statistics show that tuberculosis is rarely found in calves killed for veal and in steers and oxen killed for beef. It is almost unknown among our Western beeves. It is seen chiefly in cows slaughtered for food, and is met with most frequently among dairy cows from the outskirts of large cities and towns, particularly among the older cows. The two great predisposing causes are overcrowding in unsanitary stables and the depleting influences of lactation.

The records of the Copenhagen slaughter-houses (*Report of the Royal Commission on Tuberculosis*) show the following totals for four years, 1890–93, inclusive:

Of 132,294 beef cattle, 23,305 showed tubercle (17.70 per cent.). Of 8292 swine, 1272 showed tubercle (15.30 per cent.). Of 185,765 calves, 369 showed tubercle (0.2 per cent.). Of 337,014 sheep, 1 showed tubercle (0.0003 per cent.).

The records of the Berlin slaughter-houses for 1892–93 show as follows:

Of 142,874 beef cattle, 21,603 showed tubercle (15.1 per cent.). Of 518,073 swine, 7055 showed tubercle (1.55 per cent.). Of 108,348 calves, 125 showed tubercle (0.11 per cent.). Of 355,949 sheep, 15 showed tubercle (0.004 per cent.)

The Hygienic Importance of Light.

Aside from its influence in other directions, light has a very important action as a disinfectant as is shown by W. Kruse (*Zeitschrift für Hygiene und Infectionskrankheiten*, March 15, 1895). It has a destructive influence on living bacteria, the intensity of its action being dependent on the amount of oxygen present. With increased intensity of light comes increased disinfecting power. It does not act thus by reason of any heating influence, although the effect is greater the higher the temperature. The greater the relative number of bacteria, the slower appears the action of the light to which they are exposed; and the medium in which they exist has considerable influence on the result. Liquid media containing complex nitrogenous substances are so altered by the influence of light that they take on antiseptic properties against the bacteria. This change ensues under the influence of the atmospheric oxygen, and is manifest so much the more according to the intensity of the light and duration of exposure.

Hygiene of Slaughtering.

According to J. A. Dembo, of St. Petersburg (*Deutsche Vierteljahrsschrift für öppentliche Gesundheitspflage*, Bd. xxvi., p. 668), the Jewish method of slaughtering is the most rational from a hygienic standpoint, for in consequence of the rapid and more or less complete bleeding, and also of the convulsive movements which occur toward the end of the bleeding, lactic acid is developed, which, through its further chemical action on potassium phosphate, forms potassium lactate and acid phosphate of potassium. The latter hinders the development of micro-organisms, delays the formation of ptomaines and other poisonous substances, and improves the taste. The small amount of blood left in the animal becomes less alkaline, and, therefore, a less favorable soil for the development of bacteria. The convulsive movements cause the meat to be more tender, and improve its appearance. Fur-

thermore, by reason of the earlier occurrence of rigor mortis, the meat is the more quickly ready for use, and will keep several days longer than ordinarily.

Soap as a Disinfectant.

Dr. Max Jolles (*Zeitschrift für Hygiene und Infectionkrankheiten*, January 25, 1895) reports that according to his experiments soap possesses a decided disinfectant power against the most common pathogenic micro-organisms, and is especially adaptable in those cases where it is the most natural agent for the purpose, that is, for the cleansing of dirty and infected linen, etc. (in cholera and typhoid fever, for instance). It possesses, in addition to its cleansing and disinfecting power, the advantage over other disinfectants of causing no injury of any sort.

Health of American Cities.

According to Dr. Arthur B. Reynolds, Commissioner of Health (*Annual Report of the Department of Health of the City of Chicago for the Year ended December* 31, 1894) Chicago is the healthiest large city in the world. Computed on the discredited official census taken in April, 1894, the death-rate is lower than ever before recorded for a city of more than 200,000 inhabitants. The figures of the official census (1,567,727) are declared to be too low, and those based on the school enrollment (1,678,967) are deemed to be worthy of acceptance as correct. But, accepting the figures of the official census, the death-rate for 1894, on this basis, was but 15.24. A table of death-rates of 1894 of all cities of the United States having a population of more than 200,000, compiled from the latest and most authoritative information, shows that Chicago stands at the head with the smallest death-rate, 15.24, followed by Detroit (15.49), Milwaukee (15.71), Cleveland (15.86), St. Louis (16.13), Buffalo (16.76), Pittsburg (18.17), Philadelphia (18.28), Cincinnati (18.29), San Francisco (18.85), Baltimore (19.11), Brooklyn (20.14), Washington (20.23), New York (21.05), Boston (22.99), and New Orleans (24.88).

Corrigendum.

In Dr. Althaus's paper on Hypochondriasis and Nosophobia, in the July No., on page 6, line 19 from top, read "*Brachet sen.*" instead of *Brachetsen.*

Note to Contributors.—All contributions intended for insertion in the Original Department of this Journal are only received *with the distinct understanding that they are contributed exclusively to this Journal.*

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